

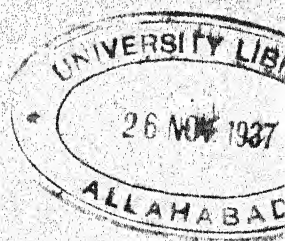
L. O. GAISER

CHROMOSOME NUMBERS IN ANGIOSPERMS

III

Reprint from: GENETICA XII, 1930

The Hague, Martinus Nijhoff



L. O. GAISER

CHROMOSOME NUMBERS IN ANGIOSPERMS II

Bibliographia Genetica VI, 1930

ERRATA

Page 189 — In connection with *Melandrium alba* see also references for *Lychnis alba* MILL. (GAISER 1926).

„ 204 — Insert *Capparis spinosa* L.: $2n = 38$; KUHN, 1928b.

„ 225 — *Rubus thyrsiger* BAB.; $n = 5 + 4_1$.

„ 235 — Insert for *Prunus triloba* LDL.; $2n = 64$; KOBEL, 1927, instead of DARLINGTON 1928.

„ 236 — All the numbers for *Prunus avium* varieties should be under the $2n$ column instead of the n column.

Pages 236, 237, 240, 241, 244, 245 and 246 — Where CRANE 1927 is given, the name is intended as a bibliographic reference. The counts were made by DARLINGTON and given by CRANE 1927.

Page 344 — *Tripsacum Barberi* JESW. Should be *Saccharum Barberi* JESW.

„ 345 — *Kassoer* not *Kassover*.

Pages 358—366 — Omit references to BLEIER 1926.

Page 455 — SKALINSKA and CUCHTMAN should be 1927 instead of 1926.

CHROMOSOME NUMBERS IN ANGIOSPERMS III

BY

L. O. GAISER

As stated in the previous publication (GAISER 1930) lists of chromosome numbers were to be prepared annually to supplement those of the two previous lists (1926, 1930). The latter include investigations up to the end of 1928. The present includes the results of researches published during 1929 as well as some of 1928 which had not been received in time for the earlier papers.

The same method of arrangement as had been used previously has been followed here so that there may be as much uniformity as possible. Other annual supplemental lists will follow regularly in this same publication.

DICOTYLEDONEAE

VERTICILLATAE CASUARINACEAE

	n	2n	
<i>Casuarina equisetifolia</i> LINN. .		ca. 24	WETZEL, 1929.
" <i>montana</i> LESCHEN. .		24	" "
" <i>stricta</i> (DRYANDER)			
AIT.		ca. 24	" "

SALICALES SALICACEAE

<i>Salix aurita</i>	19		HÄKANSSON, 1929c.
" <i>caprea</i>	19		" "
" <i>gracilistyla</i>	19 ¹⁾		SINOTO, 1929b.
" <i>japonica</i>	19 ¹⁾		" "
" <i>laurina</i> f. <i>hortensis</i>	38 ²⁾ + 61-71		HÄKANSSON, 1929c.
	2		
" <i>leucopithecia</i>	19 ¹⁾		SINOTO, 1929b.
" <i>melanostachys</i>	19 ¹⁾		" "
" <i>sachalinensis</i>	19 ¹⁾ , ca.		" "
	24 ³⁾		" "
" <i>viminialis</i>	19		HÄKANSSON, 1929c.
" <i>cinerea</i> × <i>S. phylicifolia</i>	44		" "
(" <i>repens</i> × <i>S. viminialis</i>) ×			
<i>S. repens</i> F ₂ = <i>S. ame-</i>			
<i>rinoides</i>		ca. 76	" "
" <i>viminialis</i> × <i>S. caprea</i> ♀			
(<i>laurina</i> <i>artefacta</i>) . . .		76	" "
" <i>viminialis</i> × <i>S. caprea</i> F ₁	19		" "
" <i>viminialis</i> × <i>S. caprea</i> F ₂	19		" "

¹⁾ An unequal pair of chromosomes was distinguishable in meiotic divisions of the male flowers.

²⁾ Frequently a quadrivalent resulted from the fusion of 2 bivalents or a trivalent from the fusion of a bivalent and a univalent.

The somatic number was judged, by meiotic conditions, to be 82-84.

³⁾ A form of *S. sachalinensis* from Hokkaido had ca. 24 chromosomes and showed irregular divisions.

SALICACEAE (continued)	n	2n	
<i>Salix</i> (continued)			
<i>Salix viminalis</i> × <i>S. caprea</i> F ₂ (aurita-like).	19, 20	38-39	HÅKANSSON, 1929c.
„ <i>viminalis</i> × <i>S. caprea</i> F ₁ ♂	19	„	„
„ <i>viminalis</i> × <i>S. caprea</i> F ₂ ♂	19	„	„
„ <i>viminalis</i> × <i>S. caprea</i> F ₂ ♂ (<i>gigantea</i>).	$\frac{14_3 + 5 + 5_1}{2}$	$\frac{19_3}{2}$ 57	„
„ <i>viminalis</i> var. <i>yezoensis</i>	19 ¹⁾		SINOTO, 1929b.

FAGALES

BETULACEAE

<i>Carpinus betulus</i> L.	8	WETZEL, 1929.
<i>Ostrya carpinifolia</i> SCOP. . . .	8	„
<i>Corylus americana</i> MILL. . . .	11	„
„ <i>americana</i> WALT.	14 ²⁾	WOODWORTH, 1929c.
„ <i>avellana</i> L.	11	WETZEL, 1929.
	14 ³⁾	WOODWORTH, 1929c.
„ <i>avellana</i> var. <i>pendula</i> GOESCHKE	14 ⁴⁾	„
„ <i>columna</i> L.	14 ⁴⁾	„
„ <i>cornuta</i> MARSH. (<i>C. ros-</i> <i>trata</i> AIT.)	14 ⁵⁾	„
„ <i>heterophylla</i> FISCH.	14 ⁴⁾	„
„ <i>heterophylla</i> var. <i>sut-</i> <i>chuensis</i> FRANCH.	14 ⁴⁾	„
„ <i>maxima</i> MILL. (<i>tubulosa</i> WILLD.)	11	WETZEL, 1929.
„ <i>maxima</i> MILL.	14	WOODWORTH, 1929c.
„ <i>maxima</i> var. <i>atropur-</i> <i>purea</i> DOCHNAHL	14 ²⁾	„
„ <i>pontica</i> KOCH.	14 ⁴⁾	„
„ <i>rostrata</i> AIT. var. <i>mandschurica</i> (MAX.) REG.	11	WETZEL, 1929.
„ <i>sieboldiana</i> BLUME	14 ⁴⁾	WOODWORTH, 1929c.
„ <i>sieboldiana</i> var. <i>mand-</i> <i>schurica</i> (BL.) SCHNEID.	14 ³⁾	„

¹⁾ See foot-note 1 page 162.²⁾ Meiosis somewhat abnormal.³⁾ Meiosis mostly normal.⁴⁾ Meiosis normal.⁵⁾ Meiosis abnormal.

BETULACEAE (continued)	n	2n	
<i>Corylus</i> (continued)			
<i>Corylus tibetica</i> BATALIN . . .	14 ¹⁾		WOODWORTH, 1929c.
" #9 („ <i>C. vollesteni</i> ")	14 ²⁾		" "
× <i>Corylus spinescens</i>			
REHD. (<i>C. tibetica</i> ×			
<i>C. avellana</i>)	14 ¹⁾		" "
× <i>Corylus vilmorinii</i>			
REHD. (<i>C. chinensis</i> ×			
<i>C. avellana</i>)	14 ¹⁾		" "
BETULA			
<i>Betula nana</i> L.	14		WETZEL, 1929.
Subsection <i>Costatae</i>			
<i>Betula grossa</i> SIEB. et ZUCC. .	42 ¹⁾		WOODWORTH, 1929a.
" <i>lenta</i> L.	14 ¹⁾		" "
" <i>lutea</i> MICHX.	42 ²⁾		" "
" <i>nigra</i> L.	14 ¹⁾		" "
" <i>Schmidtii</i> REGEL.	14, 10+8 ³⁾		" "
	$\frac{2}{2}$		
" <i>coerulea-grandis</i> BLAN-			
CHARD	14 ¹⁾		" "
" <i>coerulea</i> BLANCHARD			
(<i>B. coerulea</i> = <i>B. gran-</i>			
<i>dis</i> × <i>B. populifolia</i>)..	14 ¹⁾		" "
" <i>fontinalis</i> var. <i>piperi</i>			
SARG.	14 ¹⁾		" "
" <i>japonica</i> SIEB.	14 ¹⁾		" "
" <i>japonica</i> var. <i>mandschu-</i>			
<i>rica</i> (REGEL) H. WINKL.	39-42 ³⁾ ,		" "
	$\frac{2}{2}$		
	(14+28 ₁)		" "
	$\frac{2}{2}$		
" <i>papyrifera</i> MARSH. . .	35 ⁴⁾		" "
" <i>papyrifera</i> var. <i>cordifo-</i>			
<i>lia</i> (REGEL) FERNALD .	28 ²⁾		" "
" <i>pendula</i> ROTH. <i>B. ver-</i>			
<i>rucosa</i> EHRH. (hybrid?)	14 ³ , 13+2 ₁ ,		" "
	$\frac{2}{2}$		
	12+4 ₁ , 11+6 ₁		
	$\frac{2}{2}$		
" <i>populifolia</i> MARSH. . .	14 ¹⁾		" "

¹⁾ Meiosis normal.²⁾ Meiosis somewhat abnormal.³⁾ Meiosis very abnormal.⁴⁾ Meiosis almost normal.

BETULACEAE (continued)	n	2n	
Subsection <i>Acuminatae</i> REGEL			
<i>Betula maximowicziana</i> REGEL	14 ¹⁾		WOODWORTH, 1929a.
Subsection <i>Nanae</i>			
<i>Betula pumila</i> L.	28 ¹⁾		" "
Hybrids:			
× <i>Betula jackii</i> SCHNEID. (<i>B.</i> <i>lenta</i> × <i>B. pumila</i>)	21 ²⁾		" "
× " <i>sanäbergi</i> BRITTON (<i>B.</i> <i>papyrifera</i> × <i>B. pumi-</i> <i>la</i> var. <i>glandulifera</i>)	31, 32 ³⁾		" "
" <i>davurica</i> PALL.	45 ³⁾		" "
<i>Alnus cordata</i> (LOIS.) DESF. var. <i>genuina</i> REGEL	14 ⁴⁾		WETZEL, 1929.
" <i>crispa</i> PURSH. var. <i>mol-</i> <i>lis</i> FERNALD	14 ⁵⁾		WOODWORTH, 1929c.
" <i>glutinosa</i> GAERTN.	28 ⁵⁾		" "
" <i>glutinosa</i> var. <i>vulgaris</i> SPACH.	14		WETZEL, 1929.
" <i>incana</i> L.	14		" "
" <i>incana</i> (L.) MOENCH.	14 ⁵⁾		WOODWORTH, 1929c.
" <i>japonica</i> SIEB. et ZUCC.	14		WETZEL, 1929.
"	28 ⁵⁾		WOODWORTH, 1929c.
" <i>maritima</i> (MARSH.) MUHL.	14 ⁵⁾		" "
" <i>rubra</i> BONG. (<i>A. Was-</i> <i>hingtonia</i> Hort. CALMPH., <i>A. regana</i> NUTT., <i>A. maritima</i> Hort.).	14		WETZEL, 1929.
" <i>rugosa</i> (DUROI) SPRENG.	14 ⁶⁾		WOODWORTH, 1929b, c.
" <i>subcordata</i> C. A. MEY	14		WETZEL, 1929.
" <i>viridis</i> (CHAIX.) LAM. et D.C. (= <i>A. alnobetula</i> (EHRH.) HORTIG, <i>Be-</i> <i>tula viridis</i> CHAIX.	14		" "
FAGACEAE			
<i>Fagus silvatica</i> L.	22		WETZEL, 1929.

¹⁾ Meiosis normal.²⁾ Meiosis very abnormal with varying numbers of bivalents and univalents.³⁾ Meiosis very abnormal.⁴⁾ At metaphase 10 chromosomes were in a ring and 4 were within the ring.⁵⁾ Meiosis was normal.⁶⁾ WOODWORTH (1929b) found 28 chromosomes in the embryo-sac initial where no reduction followed. Parthenogenesis and polyembryony resulted. WOODWORTH (1929c) reported meiosis extremely abnormal.

FAGACEAE (continued)	n	2n	
<i>Castanea crenata</i> (<i>C. japonica</i>)	11		WETZEL, 1929.
" <i>sativa</i> MILL. (<i>C. vesca</i> ,			
<i>C. vulgaris</i>)	11		" "
<i>Quercus cerris</i>		24	GHIMPU, 1929g.
" <i>cerris</i> L.		22	WETZEL, 1929.
" <i>coccifera</i>		24	GHIMPU, 1929g.
" <i>coccinea</i> WANGG.	11		WETZEL, 1929.
" <i>Dalechampii</i> (<i>Q. tosa</i>			
GRISEB.)	11		" "
" <i>glandulifera</i> (<i>Q. den-</i>			
<i>tata</i> var. <i>Alberti</i>).	11		" "
" <i>Ilex</i>		24	GHIMPU, 1929g.
" <i>Koehni</i> (<i>Q. Ilex</i> × <i>Q.</i>			
<i>sessilis</i> ?)	11		WETZEL, 1929.
" <i>Libani</i> OLIV.	11		" "
" <i>macranthera</i> FISCH. et			
MEY	11		" "
" <i>nigra</i> L.		22	" "
" <i>palustris</i>		24	GHIMPU, 1929g.
" <i>pontica</i> K. KOCH.	11		WETZEL, 1929.
" <i>robur</i> L. p.p. (<i>Q. pe-</i>			
<i>dunculata</i>)	11		" "
" <i>robur</i> L.	12		HOEG, 1929.
" <i>sessiliflora</i> MARTYN	12		" "
" <i>sessilis</i> EHRH. (<i>Q. ses-</i>			
<i>siliflora</i> SALISB.)	11		WETZEL, 1929.
" <i>Suber</i>	24		GHIMPU, 1929g.
" " <i>Sno-Eg</i> "	12 ¹⁾		HOEG, 1929.
" <i>sessiliflora</i> × <i>Q. robur</i> .	12 ¹⁾		" "

URTICALES

MORACEAE

<i>Morus bombycis</i> KOIDZ.	14 ²⁾		SINOTO, 1929b.
<i>Cudrania triloba</i> HANCE	28 ³⁾	" "	" "
<i>Humulus japonicus</i>	8, 9 ⁴⁾	16, 17	WINGE, 1929; KIHARA, 1929a.

¹⁾ There were present lagging chromosomes, supernumerary cells in the pollen tetrad and micro pollen grains, but to a less degree than in distinct intermediate forms between *Q. sessiliflora* × *Q. robur*.

²⁾ An unequal pair of chromosomes and also a large geminus which occasionally divided into two unequal parts were distinguishable in the meiotic divisions of male flowers.

³⁾ An unequal pair of chromosomes was distinguishable in the meiotic divisions of male flowers.

⁴⁾ According to WINGE (1929) the complex is represented by ♀ 2n = 14 + 24; ♂ 2n = 14 + 3x; ♀ n = 7 + x; ♂ n = 7 + x or 7 + 2x. According to KIHARA (1929a) the sex chromosomes form a tripartite complex of x, y, and y₂, so that ♀ 2n = 14 + 2x; ♂ 2n = 14 + y₁ + x + y₂; ♀ n = 7 + x; ♂ n = 7 + y₁ + y₂. SINOTO (1929b) confirmed KIHARA's observations.

MORACEAE (continued)	n	2n	
<i>Humulus japonicus</i> S. et Z. . .		16, 17 ¹⁾	TUSCHNIAKOWA, 1929b.
"		32, 34 ²⁾	" "
	8, 9 ³⁾		SINOTO, 1929b.
<i>Humulus lupulus</i>	10 ⁴⁾	20	WINGE, 1929.
	10, 8 + 1 ⁵⁾	20	SINOTO, 1929a.
<i>Humulus lupulus</i> L.	8 + 1 ⁵⁾		SINOTO, 1929b.
<i>Cannabis sativa</i> L.	10 ³⁾		" "

POLYGONALES

POLYGONACEAE

RUMEX

<i>Rumex acetosa</i> L.	7, 8 ⁶⁾	14, 15	SINOTO, 1929b.
" <i>turcestanicus</i> PAULSEN. ca. 20			EDMAN, 1929.
Section <i>Eulapathum</i>			
<i>Rumex pulcher</i> L.	10		SHIMAMURA, 1929.
<i>Oxyria digyna</i> (L.) HILL. . .	7 ⁷⁾	14	EDMAN, 1929.
<i>Oxyria elatior</i> R. BR.	21		" "
<i>Oxyria elatior</i> R. BR. (from Berlin-Dahlem)		14	" "
" <i>elatior</i> R. BR. (from Uppsala)		42	" "
<i>Rheum collinianum</i> BAILL. . .	11		" "
" <i>Franzenbachii</i> MUENTH. . .	22		" "
" <i>officinale</i> BAILL.	11		" "
" <i>rhaponticum</i> L.	22		" "
" <i>ribes</i> GRON.	22		" "
" <i>sanguineum</i> Hort. HA- LENS.	22		" "
" <i>Webbianum</i> ROYLE	22		" "
" <i>Wittrockii</i> K. E. LUNDSTR.	22		" "
<i>Antigonon leptopus</i> HOOK et ARN.		48	" "
<i>Coccoloba uvifera</i> L.		ca. 80	" "
<i>Reynoutria sachalinensis</i> NAKAI	22		SINOTO, 1929b.

¹⁾ In diakinesis an XY pair of chromosomes was found.²⁾ Tetraploid cells were found with 32 or 34 chromosomes.³⁾ See foot-note 4 page 166.⁴⁾ According to WINGE (1929) the complex is represented by $\varphi 2n = 18 + 2x$; $\delta 2n = 18 + x + y$; $\varphi n = 9 + x$; $\delta n = 9 + x$ or $9 + y$.⁵⁾ The tetrapartite chromosome found along with 8 bivalents was considered to be the pair of sex chromosomes; therefore, $\varphi n = 8 + x_1 + x_2$; $\delta n = 8 + x_1 + x_2$ or $8 + y_1 + y_2$ (SINOTO, 1929a and b).⁶⁾ At metaphase of meiosis of the male flowers there were 6 bivalent + 1 tetrapartite chromosome, and at anaphase 7 and 8 chromosomes, respectively. In female plants there were 14 somatic chromosomes and in male plants 15, so $\varphi 2n = 12 + 2M$; $\delta 2n = 12 + m_1 + M + m_2$; $\varphi n = 6 + M$; $\delta n = 6 + M$ or $6 + m_1 + m_2$.⁷⁾ 14 chromosomes were found in an embryo-sac-mother-cell.

CENTROSPERMAE	n	2n	
CHENOPODIACEAE			
<i>Spinacia oleracea</i> L.	6	12, 24 ¹⁾	TUSCHNJAKOWA, 1929b.
	6		SINOTO, 1929b.
„ <i>oleracea</i> MILL. var.			
Japanese spinach.	6		MAEDA & KATO, 1929.
AMARANTACEAE			
<i>Celosia cristata</i> L.	18		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
NYCTAGINACEAE			
<i>Mirabilis Jalapa</i>	ca. 27		TISCHLER, 1929a.
„ <i>longiflora</i>	ca. 27		„ „
<i>Bougainvillea glabra</i> CHOISY	10 ²⁾		COOPER, 1929.
PHYTOLACCACEAE			
<i>Phytolacca acinosa</i> ROXB. var.			
<i>Kaempferi</i> MAK.	18		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
CARYOPHYLLACEAE			
<i>Silene viscosa</i>		24	BRESLAWETZ, 1929.
<i>Lychnis alba</i>	12 ³⁾		LINDSAY, 1929.
<i>Melandrium album</i> L. ⁴⁾	12	24	BRESLAWETZ, 1929.
<i>Dianthus arenarius</i> ⁵⁾	30		ROHWEDER, 1929.
„ <i>barbatus</i>	15		„ „
„ <i>carthusianorum</i>	15		„ „
„ <i>collinus</i>	45		„ „
„ <i>deltoides</i>	15		„ „
„ <i>giganteus</i>	15		„ „
„ <i>plumarius</i> ⁶⁾	15		„ „
„ <i>plumarius</i> ⁷⁾	45		„ „
„ <i>Séguiéruii</i>	45		„ „
„ <i>Sternbergii</i>	45		„ „
„ <i>superbus</i>	15		„ „
RANALES			
NYMPHEACEAE			
<i>Nelumbo nucifera</i> GAERTN.		16	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.

¹⁾ Tetraploid cells with 24 chromosomes were found.

²⁾ In heterotypic division heteromorphic chromosomes, a small h and a large H chromosome, occurred.

³⁾ A pair of heterochromosomes was distinguished.

⁴⁾ An unequal pair of chromosomes x and y were found in somatic and meiotic divisions of ♂ plants but in ♀ plants a pair of equal size x and x occurred.

⁵⁾ Two races were studied (type and race C).

⁶⁾ Of 6 races 4 had 15 chromosomes.

⁷⁾ Of 6 races 2 had 45 chromosomes.

RANUNCULACEAE		n	2n
<i>Isopyrum biternatum</i> (RAF.)			
T. & G.			14 ¹⁾ SOROKIN, 1929.
<i>Anemonella thalictroides</i> (L.)			
SPACH			14 ²⁾ " "
<i>Clematis virginiana</i>		8	LINDSAY, 1929.
<i>Ranunculus abortivus</i> L. . . .			16 ³⁾ SOROKIN, 1929.
" <i>acris</i> L. (normal hermaphrodite) .		7	WHYTE, 1929b.
" <i>acris</i> L. (♀)		7	" "
" <i>acris</i> L. (♂)		7	" "
" <i>acris</i> L. (abnormal) .		7	" "
" <i>acris</i> L. (minus normal)		7	" "
" <i>acris</i> L. (normal × abnormal) . .		7	" "
" <i>Chius</i> D.C.			14 ⁴⁾ SOROKIN, 1929.
<i>Thalictrum aquilegifolium</i> . .			14 KUHN, 1929.
BERBERIDACEAE			
<i>Nandina domestica</i> THUNB .		10	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
MENISPERMACEAE			
<i>Menispermum canadense</i> . . .		26	LINDSAY, 1929.
MAGNOLIACEAE			
<i>Illicium anisatum</i>		14	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
RHOEADALES			
PAPAVERACEAE			
<i>Corydalis cava</i>		8	TISCHLER, 1929a.
<i>Eschscholtzia californica</i> CHAM.		6	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
CAPPARIDACEAE			
<i>Capparis spinosa</i>		38	KUHN, 1929.
CRUCIFERAE			
<i>Helioiphila pilosa</i> LAM.		10	JARETZKY, 1929.
<i>Lepidium perfoliatum</i> L. . . .		8	" "
" <i>sativum</i> L.		8	" "
<i>Biscutella auriculata</i> L.		8	" "

¹⁾ A pair of satellites were present.²⁾ The idiogram was represented by 2 (61 + 1¹). The satellites were extremely small.³⁾ The idiogram was represented by 2 (3V + v + 3J + L¹). The I chromosomes had satellites.⁴⁾ A comparatively large pair of chromosomes were present.

CRUCIFERAE (continued)	n	2n	
<i>Coronopus procumbens</i> GILIB. .	16		JARETZKY, 1929.
<i>Sisymbrium supinum</i> L. . . .	16		" "
<i>Cakile maritima</i>	9		" "
<i>Carrichtera annua</i> (L.) PRANTL.	8		" "
" <i>vella</i> D.C.	8		" "
<i>Succowia balearica</i> (L.) MED. .	16		" "
<i>Thlaspi ceratocarpon</i> (PALLAS)			
MURR.	7		" "
<i>Chorispora tenella</i> D.C.	7		" "
<i>Myagrum perfoliatum</i> L. . . .	7		" "
<i>Goldbachia laevigata</i> (M.B.)			
D.C.	14		" "
<i>Calepina irregularis</i> (Asso)			
THELL.	21		" "
<i>Brassica campestris</i> L.	10		KARPECHENKO, 1929b.
" <i>carinata</i> BRAUN.	17		" "
" <i>cernua</i> COSS.	18		MORINAGA, 1929b.
" <i>cernua</i> var. <i>Karashi</i>	18		FUKUSHIMA, 1929c.
" <i>chinensis</i>	10		MORINAGA, 1929c.
" <i>chinensis</i> L. (Komat-suna)	10		MORINAGA, 1929b.
" <i>chinensis</i> L. var. <i>parachinensis</i> (Hakkei-Taisai)	10		" 1929a, b.
" <i>japonica</i> SIEB. (Mizuna)	10		" 1929a, b.
" <i>junceae</i> var. <i>Katsuona</i>	18		FUKUSHIMA, 1929.
" <i>napella</i>	19		MORINAGA, 1929c.
" <i>napella</i> CHAIX. „Kotyosen”	19		MORINAGA, 1929a.
" <i>napus</i> L.	18		KARPECHENKO, 1929b.
" <i>oleracea</i> L.	9		KARPECHENKO, 1929a.
" <i>oleracea</i> var. <i>Succession</i>	9		FUKUSHIMA, 1929.
" <i>pekinensis</i> RUPR.	10		KARPECHENKO, 1929b.
" <i>pekinensis</i> RUPR. „Hô-tôren Kekkyû-hakusai”	10		MORINAGA, 1929a.
" <i>Rapa</i> L. „Tokinasikabu”	10		" "
" <i>Rapa</i> L.	10		MORINAGA, 1929b.
" <i>Brassica cernua</i> COSS. (Karashina) × <i>B. chinensis</i> L. (Komatsuna)	10+8 ₁	ca. 28	" "

CRUCIFERAE (continued)	n	2n	
<i>Brassica</i> (continued)			
<i>Brassica cernua</i> Coss. (<i>Karashina</i>) × <i>B. chinensis</i> L. var. <i>parachinensis</i> (Hakkei-Taisai) .	10 + 8 ₁	ca. 28	MORINAGA, 1929b.
„ <i>cernua</i> Coss. (<i>Karashina</i>) × <i>B. japonica</i> SIEB. (Mizuna) . . .	10 + 8 ₁	ca. 28	„ „
„ <i>cernua</i> × <i>B. napella</i> .	$10 + \frac{17_1}{2}$	ca. 37	„ 1929c.
„ <i>cernua</i> Coss. (<i>Karashina</i>) × <i>B. Rapa</i> L. (fodder variety) . .	10 + 8 ₁	28	„ 1929b.
„ <i>cernua</i> Coss. (<i>Karashina</i>) × <i>B. Rapa</i> L. „Tokinasikabu” .	10 + 8 ₁	ca. 28	„ „
„ <i>cernua</i> var. <i>Karashi</i> × <i>Raphanus sativus</i> var. <i>Minowase</i> . . .	27 ₁ ¹⁾		„ „
„ <i>junceae</i> var. <i>Katsuona</i> × <i>Raphanus sativus</i> (an escape)	27 ₁ ²⁾		FUKUSHIMA, 1929.
„ <i>napella</i> CHAIX. „Kotyosen” × <i>B. chinensis</i> var. <i>parachinensis</i> „Hakkei-Taisai”	$10 + \frac{9_1}{2}$	ca. 29	MORINAGA, 1929a
„ <i>napella</i> CHAIX. „Kotyosen” × <i>B. japonica</i> SIEB. „Miduna” .	$10 + \frac{9_1}{2}$	ca. 29	„ „
„ <i>napella</i> CHAIX. „Kotyosen” × <i>B. pekinensis</i> RUPR. „Hôtôren-Kekkyû-hakusai” . .	$10 + \frac{9_1}{2}$	ca. 29	„ „
„ <i>napella</i> CHAIX. „Kotyosen” × <i>B. Rapa</i> L. „Tokinasikabu” *	$10 + \frac{9_1}{2}$	ca. 29	„ „

¹⁾ In first division metaphase 27 scattered unpaired chromosomes were seen but in the second division anaphase 62—74 chromosomes were counted.

²⁾ In second division anaphase though there might be 2—5 lagging chromosomes on the spindle, they passed undivided to the poles.

CRUCIFERAE (continued)	n	2n	
<i>Brassica</i> (continued)			
<i>Brassica pekinensis</i> RUPR. „Hô-tôren-kekkyû-hakusai			
× <i>B. napella</i> CHAIX.			
„Kotyosen” . . .	$10 + \frac{9_1}{2}$	ca. 29	MORINAGA, 1929a.
<i>Raphanus raphanistrum</i> L. .	9		KARPECHENKO, 1929b.
„ <i>sativus</i> L.	9		„ 1929a.
„ <i>sativus</i>	9		FUKUSHIMA, 1929.
„ <i>sativus</i> var. <i>Minowase</i>	9		„ ”
„ <i>sativus</i> L. × <i>Brassica napus</i> L. F ₁ .	$\frac{18}{2}$	18	KARPECHENKO, 1929a.
„ <i>sativus</i> L. × <i>Brassica napus</i> L. F ₂ F ₃ .	18	36	„ ”
„ <i>sativus</i> (an escape)			
× <i>Brassica oleracea</i> var. <i>Succession</i>	18 ₁		FUKUSHIMA, 1929.
„ <i>sativus</i> L. × <i>Brassica oleracea</i> L.			
„ <i>Raphanobrassica</i> ”	18		KARPECHENKO, 1929b.
	18	36	„ and SHCHAVINSKAIA, 1929.
<i>Raphanobrassica</i> × <i>Brassica campestris</i> L. ¹⁾ .	5—6+		
	18 ₁ —16 ₁		KARPECHENKO, 1929b.
„ × <i>Brassica carinata</i> BRAUN ¹⁾	9—17+		
	17 ₁ —1 ₁		„ ”
„ × <i>Brassica napus</i> L. ¹⁾	36		„ ”
„ × <i>Brassica oleracea</i> L. ²⁾		27	„ and SHCHAVINSKAIA, 1929.
„ × <i>Brassica pekinensis</i> RUPR. ¹⁾ . .	28		KARPECHENKO, 1929b.
„ × <i>Raphanus raphanistrum</i> L. ¹⁾ . . .	9 + 9 ₁		„ ”
„ × <i>Raphanus sativus</i> L. ¹⁾		27	KARPECHENKO and SHCHAVINSKAIA, 1929.

¹⁾ During meiosis irregular distribution of chromosomes to the daughter nuclei occurred.

²⁾ During meiosis the chromosomes of *Brassica oleracea* were eliminated.

CRUCIFERAE (continued)	n	2n	
<i>Draba cinerea</i>	24		HEILBORN given by EKMAN, 1929.
" <i>daurica</i>	32		HEILBORN given by EKMAN, 1929.
" <i>groenlandica</i>	32		HEILBORN given by EKMAN, 1929.
<i>Matthiola bicornis</i> D.C.	7		JARETZKY, 1929.
" <i>incana</i>	7		" "
" <i>parviflora</i> R. BR.	7		" "
" <i>sinuata</i>	7		" "
" <i>sinuata glabra</i> var. <i>albiflora</i>	7		" "
" <i>Thessala</i> BOISS. et ORPH.	6	12	" "
" <i>tricuspidata</i> R. BR.	7		" "
" <i>tristis</i> R. BR.	6		" "
" <i>Valesiacae</i> J. GAY	6		" "
<i>Bunias orientalis</i>		14	HEITZ, 1929b.
" <i>orientalis</i> L.	7	14	HÅKANSSON, 1929b.

ROSALES

SAXIFRAGACEAE

PHILADELPHUS

Group 1 <i>Gordoniani</i> KOEHNE	13		BANGHAM, 1929.
<i>Philadelphus confusus</i> PIPER	13		" "
" <i>Gordonianus</i> LINDL.	13		" "
" <i>Lewisii</i> PURSH.	13		" "
" <i>monstrosus</i> REHD. (P? <i>Gordonianum</i> × <i>P. pubescens</i>)	13		" "
" <i>pubescens</i> LOIS.	13		" "
" <i>pubescens</i> var. <i>intectus</i> A. H. MOORE	13		" "
Group 2 <i>Sericanthi</i> REHD.			
<i>Philadelphus Delavayi</i> L. HENRY	13		" "
" <i>incanus</i> KOEHNE.	13		" "
" <i>Magdalenae</i> KOEHNE	13		" "
" <i>purpurascens</i> REHD.	13		" "
" <i>Sericanthus Rehderianus</i> KOEHNE	13		" "

SAXIFRAGACEAE (continued)	n	2n	
PHILADELPHUS (continued)			
Group 2 <i>Sericanthi</i> REHD. (continued)			
<i>Philadelphus subcanus</i> KOEHNE	13		BANGHAM, 1929.
Group 3 <i>Coronarii</i> KOEHNE			
<i>Philadelphus coronarius</i> L. . .	13		" "
" <i>coronarius</i> var.			
<i>salicifolius</i> JACQUES	13		" "
" <i>Falconeri</i> SARG. (<i>P. coronarius</i> × <i>P. laxus</i>) . .	13		" "
" <i>floribundus</i> SCHRAD. (<i>P. coronarius</i> × ? <i>P. Gordonianus</i>) .	13		" "
" <i>maximus</i> REHD. (<i>P. pubescens</i> × <i>P. tomentosus</i>) .	13		" "
" <i>nepalensis</i> KOEHNE	13		" "
" <i>pekinensis</i> RUPR.	13		" "
" <i>satsumanus</i> MIQ.	13		" "
" <i>satsumanus</i> var. <i>nikoensis</i> . . .	13		" "
" <i>Schrenkii</i> var. <i>Jackii</i> KOEHNE	13		" "
" <i>tomentosus</i> WALL	13		" "
" <i>Zeyheri</i> SCHRAD. (<i>P. coronarius</i> × <i>P. inodorus</i> or <i>grandiflorus</i>) . .	13		" "
Group 4 <i>Speciosi</i> KOEHNE			
<i>Philadelphus floridus</i> BEADLE .	13		" "
" <i>inodorus</i> L. . . .	13		" "
" <i>laxus</i> SCHRAD. .	13		" "
" <i>magnificus</i> KOEHNE (<i>P. grandiflorus</i> × <i>P. pubescens</i>)	13		" "
<i>Philadelphus splendens</i> REHD. (<i>P. grandiflorus</i> × ? <i>P. Gordonianus</i>)	13		" "

SAXIFRAGACEAE (continued)	n	2n	
PHILADELPHUS (continued)			
Group 5 Microphylli KOEHNE			
<i>Philadelphus cymosus</i> REHD.			
(<i>P. Lemoinei</i> × ? <i>P. grandiflorus</i>)	13		BANGHAM, 1929.
" <i>cymosus</i> „Con- quette”	13		" "
" <i>cymosus</i> „Norma”	13		" "
" <i>Lemoinei</i> LEMOI- NE (<i>P. micro-</i> <i>phyllus</i> × <i>P. co-</i> <i>ronarius</i>) . . .	13		" "
" <i>polyanthus</i> REHD. „Favorite” (<i>P.</i> <i>Lemoinei</i> × ? <i>P. insignis</i>) . .	13		" "
" <i>virginalis</i> REHD. (<i>P. Lemoinei</i> × ? <i>P. nivalis ple-</i> <i>nus</i>)	13		" "
Group 6 Gemmati KOEHNE			
<i>Philadelphus hirsutus</i> NUTT. .	13		" "
" — „Atlas” LEMOINE . . .	13		" "
" — „Giran- dole” LEMOINE .	13		" "
<i>Hydrangea opuloides</i> K. KOCH f. <i>Hortensis</i> MAXIM.	18		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
<i>Ribes aureum</i> PURSH.	16		DARLINGTON, C. D., 1929a.
<i>Ribes Gordonianum</i> LEM.	16		DARLINGTON, 1929a.
" <i>grossularia</i> LINN.	16		" "
" <i>nigrum</i> LINN.	16		" "
" <i>oxyacanthoides</i> LINN. . . .	16		" "
" <i>sanguineum</i> PURSH.	16		" "
ROSACEAE			
<i>Chaenoma leschenaultiana</i> KOIDZ.	17		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
<i>Pyrus amurensis</i>	34		NEBEL, 1929a.
<i>Malus amurensis</i>	34		" 1929b.
<i>Pyrus baccata</i>	34		" 1929a.
<i>Malus baccata</i> BORKH.	17		" 1929b.
<i>Pyrus calleryana</i>	34		" 1929a.
<i>Malus calleryana</i> DECNE . . .	34		" 1929b.

ROSACEAE (continued)	n	2n	
<i>Pyrus coronaria</i>		68±2	NEBEL, 1929a.
<i>Malus coronaria</i> MILL.		34, 68	" 1929b.
" <i>floribunda</i> SIEB.		34	" "
" <i>fusca</i> SCHNEID.	17		" "
<i>Pyrus glaucescens</i>		68	" 1929a.
<i>Malus glaucescens</i> REHD.	34		" 1929b.
<i>Pyrus halliana</i>		34	" 1929a.
<i>Malus halliana</i> KOEHNE		34	" 1929b.
<i>Pyrus ioensis</i>		34	" 1929a.
<i>Malus ioensis</i> BRIT.	17		" 1929b.
" <i>malus</i> BRIT.		34	" "
<i>Pyrus niedzweckyana</i>		34	" 1929a.
<i>Malus niedzweckyana</i> DIECK		34	" 1929b.
<i>Pyrus prunifolia</i>		34	" 1929a.
<i>Malus prunifolia</i> BORKH.		102	" 1929b.
<i>Pyrus prunifolia macrocarpa</i>		34	" 1929a.
<i>Malus prunifolia macrocarpa</i>	17		" 1929b.
<i>Pyrus rivularis</i>		34	" 1929a.
" <i>Sargenti</i>		34	" "
<i>Malus Sargenti</i> REHD.	17?		" 1929b.
<i>Pyrus Scheideckeri</i>		34	" 1929a.
<i>Malus Scheideckeri</i> ZABEL.	17	34	" 1929b.
" <i>Sieboldii</i> REHD.	17?		" "
<i>Pyrus Soulardi</i>		34	" 1929a.
<i>Malus Soulardi</i> BRIT.	17?		" 1929b.
<i>Pyrus spectabilis</i>		51±1	" 1929a.
<i>Malus spectabilis</i> BORKH.	17, 25	51	" 1929b.
" <i>sylvestris</i>	17?		" 1929b.
<i>Pyrus ussuriensis</i>		34	" 1929a.
<i>Malus ussuriensis</i> (Ba Li Hsi-ang × Hung Guar)		34	" 1929b.
" <i>ussuriensis</i> (seedling self pollinated)		34	" 1929b.
<i>Pyrus</i> varieties:			
<i>Allington Pippin</i>		34	CRANE & LAWRENCE, 1929.
<i>Annie Elizabeth</i>		34	" " "
<i>Beauty of Bath</i>		34	" " "
<i>Blenheim Orange</i>		51	" " " ;
			CRANE, 1929.
<i>Bramley's Seedling</i>		51	CRANE & LAWRENCE, 1929;
			CRANE, 1929.
<i>Carlisle Pippin</i>		34	CRANE & LAWRENCE, 1929.
<i>Cox's Orange Pippin</i>		34	" " "
<i>Early Victoria</i>		34	" " "

ROSACEAE (continued)	n	2n	
<i>Pyrus</i> varieties (continued)			
<i>Genet Moyle</i>		51	CRANE & LAWRENCE, 1929.
<i>Grenadier</i>		34	" " "
<i>Irish Peach</i>		34	" " "
<i>Kentish Codlin</i>		34	" " "
<i>Keswick Codlin</i>		34	" " "
<i>Lane's Prince Albert</i>		34	" " "
<i>Lord Derby</i>		34	" " "
<i>Manx Codlin</i>		34	" " "
<i>Newton Wonder</i>		34	" " "
<i>Northern Spy</i>		34	" " "
<i>Oslins</i>		34	" " "
<i>Reinette Zuccamaglio</i>		34	" " "
<i>Rival</i>		34	" " "
<i>Winter Majetin</i>		34	" " "
<i>Worcester Pearman</i>		34	" " "
<i>Sorbus aria</i>	17		SAX, 1929.
<i>Sorbaronia Dipelii</i> = (<i>Sorbus</i> <i>aria</i>) × (<i>Aronia melanocarpa</i>)	17		" "
<i>Sorbopyrus auricularis bulbifor-</i> <i>mis</i>	$17 + \frac{17_1}{2}$ ¹⁾		" "
<i>Malus</i> varieties:			
<i>Adersleber Calville</i>		34	NEBEL, 1929c.
<i>Apfel aus Lunow</i>		34	" "
<i>Baldwin</i>		51	" "
<i>Calville Grossherzog von Ba-</i> <i>den</i>		34	" "
<i>Charlamowsky</i>		34	" "
<i>Cola</i>		70 ± 2	" 1929a.
<i>Kola</i> (Elk River (<i>ioensis</i> ?) × <i>Charlamowsky</i>)	34	68	" 1929b.
<i>Der Böhmer</i>		34	" 1929c.
<i>Dolgo</i>		34	" 1929a, b.
<i>Eden</i>		34	" " "
<i>Geh</i> — <i>Dr. Oldenburg</i>		34	" 1929c.
<i>Gelber Bellefleur</i>		34	" "
" <i>Richard</i>		34	" "
<i>General von Hammerstein</i> . .		34	" "
<i>GoldreINETTE von Blenheim</i> .		51	" "
<i>Gravensteiner</i>		51	" "

¹⁾ SAX considered this to be a back cross of a diploid egg cell of the F₁ hybrid with a pollen grain from *Pyrus*.

ROSACEAE (continued)	n	2n	
<i>Malus</i> varieties (continued)			
<i>Gravensteiner von Hesam</i> . . .		51	NEBEL, 1929c.
" " <i>Palaisar</i> . . .		51	" "
<i>Henze's Gravensteiner</i> . . .		51	" "
<i>Koch's Gravensteiner</i> . . .		51	" "
<i>Lane's Prinz Albert</i> . . .		51	" "
<i>Lesans Calville</i>		34	" "
<i>Mank's Küchenapfel</i>		34	" "
<i>McIntosh</i>	17	34	" 1929b.
		34	" 1929a.
<i>Minister von Hammerstein</i> .		34	" 1929c.
<i>Ontario</i>		34	" "
<i>Red Astrachan</i>		34	" 1929a.
<i>Roter Astrachan</i>	17	34	" 1929b.
<i>Red Siberian Crab</i> ¹⁾		34	" 1929a.
" " " (Niles)	16+1 ²⁾	34	" 1929b.
" " " (Rodgers)	17		" "
<i>Ribston's Pepping</i>		51	" 1929c.
<i>Roter Gravensteiner</i>		51	" "
" <i>Jungfernapfel</i>		34	" "
<i>Schleibnitzer Gravenstein</i> . .		51	" "
<i>Schöner von Boskoop</i>		51	" "
<i>Sommerrambour</i>		34	" "
<i>Spätblühender Taffetapfel</i> .		34	" "
<i>Weidner's Goldreinette</i> . . .		34	" "
<i>Winesap</i>		34	" 1929a.
	17		" 1929b.
<i>Winesap</i> (Seedling)		ca. 35	" 1929b.
<i>Yellow Newtown</i>		34	" 1929a.
	17	34	" 1929b.
<i>Zwanzig Unzenapfel</i>		34	" 1929c.
Apple stocks			
<i>Doucin</i> (Malling Type II) .		34	CRANE & LAWRENCE, 1929.
<i>Jaune de Metz</i> (Malling Type IX)		34	" " "
<i>Nonsuch</i> (Malling Type VI) .		34	" " "
<i>Old English Broadleaf</i> (Malling Type I)		34	" " "
<i>Eriobotrya japonica</i> LINDL. . .	17		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
<i>Rubus rusticanus inermis</i> . . .		14	CRANE & LAWRENCE, 1929; CRANE, 1929.

¹⁾ Varieties from two different localities were examined.²⁾ This was a very small chromosome.

ROSACEAE (continued)	n	2n	
<i>Rubus</i> (continued)			
<i>Rubus thyrsgiger</i>		28	CRANE & LAWRENCE, 1929; CRANE, 1929.
" — „Laxtonberry”		49	DARLINGTON, 1929c; CRANE, 1929.
" — var. „Lloyd George”		14	CRANE & LAWRENCE, 1929; CRANE, 1929.
" — „Loganberry” .		42	DARLINGTON, 1929c; CRANE, 1929.
" — „Mahdi” . . .		21	DARLINGTON, 1929c; CRANE, 1929.
" — „Superlative” .		14	DARLINGTON, 1929c; CRANE, 1929.
" — „Veitchberry” .		28	DARLINGTON, 1929c; CRANE, 1929.
" <i>rusticanus inermis</i> × <i>R.</i> <i>thyrsgiger</i>		21	CRANE & LAWRENCE, 1929; CRANE, 1929.
		28	CRANE & LAWRENCE, 1929; CRANE, 1929.
<i>Fragaria bracteata</i>		14	YARNELL, 1929a.
" <i>Californica</i>		14	" "
" <i>chiloensis</i>		56	CRANE, 1929.
" <i>collina</i> EHRH. . . .		14	YARNELL, 1929a.
" <i>Duchesnea</i>		14	" "
" <i>elatior</i>		42	CRANE, 1929.
" <i>maxima</i>		14	YARNELL, 1929a.
" <i>mexicana</i>		14	" "
" <i>nilgerrensis</i> SCHLECHT		14	" "
" <i>vesca</i>		14	" " ; CRANE, 1929.
" <i>virginiana</i>		56	CRANE, 1929.
" sp. (F. P. I. 64856) from Manchuria . .		14	YARNELL, 1929a.
" sp. (429) from Hawaii		14	" "
" <i>bracteata</i> × <i>F. vesca</i> <i>rosea</i>	14		ICHYIMA, 1926.
(<i>F. bracteata</i> × <i>F. vesca rosea</i>) (<i>F. bracteata</i> × <i>F. vesca rosea</i>)		28 ¹⁾	YARNELL, 1929b.
<i>F. bracteata</i> × (<i>F. bracteata</i> × <i>F. vesca rosea</i>) (<i>F. bracteata</i> × <i>F. vesca rosea</i>)		ca. 21 2	" "

¹⁾ Seven such tetraploids were produced.

ROSACEAE (continued)		n	2n	
<i>Fragaria</i> (continued)				
<i>F. vesca</i> × (<i>F. bracteata</i> × <i>F. vesca rosea</i>) (<i>F. bracteata</i> × <i>F. vesca rosea</i>)			ca. $\frac{21^1}{2}$	YARNELL, 1929b.
(<i>F. bracteata</i> × <i>F. vesca rosea</i>) × <i>Fragaria</i> —? F. P. I. 64856 (from China)			ca. $\frac{21^1}{2}$	" "
(<i>F. bracteata</i> × <i>F. vesca rosea</i>) × <i>F. collina</i>			ca. $\frac{21^1}{2}$	" "
<i>Potentilla alba</i>	7			TISCHLER, 1929a.
	14			" 1929b.
" <i>anserina</i>	14			" "
" <i>aurea</i>	7			" 1929a.
	ca. 28			" 1929b.
" <i>chinensis</i> SER.	ca. 28			SHIMOTOMAI, 1929.
" <i>fragarioides</i> L.		14		" "
" <i>grandiflora</i>	14			TISCHLER, 1929b.
" <i>Kleiniana</i> WIGHT et ARN.		14		SHIMOTOMAI, 1929.
" <i>matsumurae</i> WOLF.		28		" "
" <i>multijida</i>	7			TISCHLER, 1929b.
" <i>nipponica</i> WOLF.		28		SHIMOTOMAI, 1929.
" <i>nitida</i>	7			TISCHLER, 1929b.
" <i>opaca</i> L. (from Dresden)	14			" 1929a.
" <i>opaca</i> L. (from Lübeck)	7			" "
" <i>opaca</i>	7, 14			" 1929b.
" <i>rupestris</i>	7			" 1929b.
" <i>villosa</i> (Typ.)	7			" "
" <i>verna</i> L. & P.				
<i>opaca</i> L. (= <i>P. T. bernaemontani</i> ASCHERS × <i>P. rubens</i> LIMM.)	7+ $\frac{14_1}{2}$			" 1929a.
<i>Rosa acicularis</i> LINDL.	21			ERLANDSSON, 1929.
" <i>acicularis</i> var. <i>bourgeaui-ana</i>	21			" "

¹⁾ In the buds the chromosomes usually arranged themselves in groups of 10 disomes + an unpaired chromosome. Sometimes 3 groups of 4, 1 group of 3 and 3 groups of 2 chromosomes appeared. At the second metaphase 10 and 11 chromosomes were found most frequently.

ROSACEAE (continued)	n	2n	
<i>Rosa</i> (continued)			
<i>Rosa acicularis</i> var. <i>lacorum</i> ¹⁾	21&28		ERLANSSON, 1929.
„ <i>acicularis</i> var. <i>nipponensis</i>	7		„ „
„ <i>acicularis</i> var. <i>rotunda</i>	21		„ „
„ <i>acicularis</i> var. <i>sayiana</i> ²⁾	21		„ „
„ <i>acicularioides</i>	7	14	„ „
„ <i>alcea</i>	14		„ „
„ <i>aldersonii</i>	14		„ „
„ <i>arkansana</i>	14		„ „
„ <i>blanda</i> AIT. ³⁾	7		„ „
„ <i>blanda glandulosa</i>	7	14	„ „
„ <i>blanda glandulosa</i> (seedlings) ⁴⁾	7, 8	14, 15, 16,	„ „
„ <i>blanda</i> var. <i>hermanni</i>		14	„ „
„ <i>blanda</i> var. <i>hispida</i> ⁵⁾	7		„ „
„ <i>brachycarpa</i>	14		„ „
„ <i>bracteata</i> WENDL.	7		„ „
„ <i>bushii</i> RYDB.	14		„ „
„ <i>butleri</i> RYDB.	21		„ „
„ <i>Californica</i>	14		„ „
„ <i>carolina</i> L. ²⁾	14		„ „
„ <i>carolina</i> var. <i>litoralis</i>	14		„ „
„ <i>cinnamomea</i> L.	7		„ „
„ <i>deamii</i>	14		„ „
„ <i>engelmanni</i> ⁶⁾	21		„ „
„ <i>fendleri</i> CRÉPIN ²⁾	7		„ „
„ <i>foliolosa alba</i> ²⁾	7		„ „
„ <i>granulifera</i> RYDB.	7		„ „
„ <i>gymnocarpa</i> NUTT.	7		„ „
„ <i>hypoleuca</i> W. & S.	7	14	„ „
„ <i>lyoni</i> ³⁾	14		„ „
„ <i>macdougalli</i>	21		„ „
„ <i>macounii</i> GREENE	7	14	„ „
„ <i>michiganensis</i>	7		„ „
„ <i>myriantha</i>	14	28	„ „
„ <i>nutkana</i> PRESL.	21		„ „

¹⁾ The specimen from Michigan had $n = 21$ and that from Alaska had $n = 28$.

²⁾ Two different collections gave the same number.

³⁾ Three different collections gave the same number.

⁴⁾ 5 of 9 seedlings showed $n = 7$, 2 showed $2n = 14$, while one showed $n = 8$ and $2n = 16$ and the other $n = 7$, 8 and $2n = 15$.

⁵⁾ Five different collections gave the same number.

⁶⁾ Six different collections gave the same number.

ROSACEAE (continued)	n	2n	
<i>Rosa</i> (continued)			
<i>Rosa obovata</i>	14		ERLANSOON, 1929.
" <i>palustris</i> MARSH.	7		" "
" <i>palustris</i> var. <i>inermis</i>	7		" "
" <i>petiolata</i>	14		" "
" <i>pisocarpa</i> A. GRAY	7		" "
" <i>puberulenta</i> RYDB.	7		" "
" <i>pyrifera</i> RYDB.	7, 8	14, 16	" "
" <i>ratonensis</i>	14		" "
" <i>relicta</i>	14		" "
" <i>rudiuscula</i> ¹⁾	14	28	" "
" <i>salicetorum</i>	7		" "
" <i>schuettea</i>	7		" "
" <i>serrulata</i> RAF. ²⁾	14	28	" "
" <i>setigera</i> MICHX	7		" "
" <i>spaldingii</i> ³⁾	21		" "
" <i>subblanda</i> RYDB.	7		" "
" <i>subglauca</i>	14	28	" "
" <i>subserrulata</i> ⁴⁾	7, 14		" "
" <i>suffulta</i> ⁵⁾	14		" "
" <i>suffulta</i> var. <i>valida</i>	14		" "
" <i>underwoodii</i> RYDB.	21		" "
" <i>ultramontana</i> WATS.	7		" "
" <i>virginiana</i> ¹⁾	14		" "
" <i>woodsii</i> LINDL. ⁶⁾	7	14	" "
" „Konrad Ferdinand Meyer”	14		HAASE-BESSELL, 1929.
? „ <i>blanda</i> × <i>R. carolina</i>	$7 + \frac{7}{2}$	21	ERLANSOON, 1929.
" <i>rugosa</i> × ? <i>R. blanda</i> (× <i>R. tetonkaha</i>)	7		" "
? „ <i>virginiana</i> × <i>R. carolina</i>	$7 + \frac{7}{2}$	21	" "
<i>Prunus avium</i> varieties:			
<i>Büttner's späte rote Knorpelkirsche</i>	8		LINDENBEIN, 1929.
<i>Flamentiner</i>	8		" "
<i>Frühe Französische</i>	8		" "

¹⁾ See foot-note 3 page 19.²⁾ See foot-note 2 page 19.³⁾ Five different collections gave the same number.⁴⁾ Of the two collections one from Texas showed $n = 7$ and one from Arkansas $n = 14$.⁵⁾ Eight different collections gave the same number.⁶⁾ Four different collections gave the same number.

ROSACEAE (continued)	n	2n	
<i>Prunus avium</i> varieties (continued)			
<i>Früheste der Mark</i>	8		LINDENBEIN, 1929.
<i>Frühe Werder</i>	8		" "
<i>Kassins Frühe</i>	8		" "
<i>Kunzes Kirsche</i>	8		" "
<i>Maibigarreau</i>	8		" "
<i>Rote Maikirsche</i>	8		" "
<i>Schneiders späte rote Knor- pelkirsche</i>	8		" "
<i>Weisse Spanische</i>	8		" "
<i>Prunus avium</i>		16	CRANE, 1929.
" <i>cerasifera</i>		16	CRANE & LAWRENCE, 1929; CRANE, 1929.
" <i>domestica</i>		48	CRANE & LAWRENCE, 1929; CRANE, 1929.
" <i>insititia</i>		48	CRANE & LAWRENCE, 1929; CRANE, 1929.
" <i>laurocerasus</i> ¹⁾		170-180	MEURMAN, 1929b.
" <i>mahaleb</i>		16	CRANE, 1929.
" <i>persica</i>		16	" "
" <i>spinosa</i>		32	CRANE & LAWRENCE, 1929; CRANE, 1929.
" <i>domestica</i> × <i>P. cerasi- fera</i>		32	CRANE & LAWRENCE, 1929; CRANE, 1929.
" <i>insititia</i> × <i>P. spinosa</i> .		40	CRANE & LAWRENCE, 1929; CRANE, 1929.
" <i>cerasus</i> × <i>P. avium</i> .		32	CRANE, 1929.
LEGUMINOSAE			
<i>Acacia arabica</i>		±52&±104	GHIMPU, 1929b, e.
" <i>cyanophylla</i>		26	" " "
" <i>dealbata</i>		26	" " "
" <i>decurrens</i>		26	" 1929e.
" <i>eburnea</i>		±52&±104	" "
" <i>Farnesiana</i>		±52&±104	" 1929b, e.
" <i>horrida</i>		±52&±104	" " "
" <i>longifolia</i>		26	" 1929e.
" <i>nilotica</i>		±52&±104	" 1929b, e.
" <i>podalyraefolia</i>		26	" 1929e.
" <i>saligna</i>		26	" "
" <i>scorpioides</i> var. <i>astrin- gens</i>		52,104&208	" "

¹⁾ No haploid number, in the strict sense of the word, exists because segregation is variable and gametes with various numbers of chromosomes were found.

LEGUMINOSAE (continued)	n	2n	
<i>Acacia</i> (continued)			
<i>Acacia scorpioides</i> var. <i>pubescens</i>		52&104	GHIMPU, 1929e.
<i>Cassia occidentalis</i> L.	13		MUTO, 1929.
MEDICAGO			
Section <i>Falcago</i>			
<i>Medicago sativa</i>		32	GHIMPU, 1929d.
Section <i>Lupularia</i>			
<i>Medicago lupulina</i>		16	" "
Section <i>Spirocarpos</i>			
<i>Medicago disciformis</i>		16	" "
" <i>Echinus</i>		16	" "
" <i>Helix</i>		16	" "
" <i>maculata</i>		16	" "
" <i>minima</i>		16	" "
" <i>orbicularis</i>		16	" "
" <i>rigidula</i>		16	" "
" <i>scutellata</i>		32	" "
" <i>sphaerocarpha</i>		16	" "
" <i>Tenoreana</i>		16	" "
" <i>tornata</i>		16	" "
" <i>truncatula</i>		16	" "
<i>Psoralea bituminosa</i>	ca. 20		KREUTER, 1929.
" <i>glandulosa</i>	ca. 20		" "
" <i>palaestina</i>	ca. 20		" "
<i>Indigofera Gerardina</i>	24		" "
<i>Galego officinalis</i>	8		" "
" <i>orientalis</i>	8		" "
<i>Calophaca wolgarica</i>	8		" "
<i>Robinia hispida</i> ¹⁾			" "
" <i>pseudacacia</i>	10		" "
<i>Astragalus boeticus</i>	8		" "
" <i>desamus</i>	8		" "
" <i>falcatus</i>	8		" "
" <i>galegiformis</i>	8		" "
" <i>monspessulanus</i>	8		" "
" <i>vulpinus</i>	8		" "
<i>Biserrula pelecinus</i>	8		" "
<i>Glycyrrhiza echinata</i>	8		" "
<i>Cicer arietinum</i>		14	RAU, 1929b.
<i>Vicia faba</i> L. var. <i>megalo-</i> <i>sperma</i>	6		MAEDA & KATO, 1929.

¹⁾ Irregular divisions suggested that this was a hybrid.

LEGUMINOSAE (continued)	n	2n	
<i>Pisum sativum</i>	7 ¹⁾		HÅKANSSON, 1929a.
„ <i>sativum</i>	7		RICHARDSON, 1929.
„ <i>sativum</i> sterile (race from Tibet × cultivated)	14 ²⁾		„ „
	$\frac{2}{}$		
✓ <i>Phaseolus chrysanthos</i> SAV.			
var. <i>Beni-adzuki</i>		22	MUTO, 1929.
„ <i>Chiba-urumi</i>		22	„ „
„ <i>Dainagon</i>	11	22	„ „
„ <i>Kensaki</i>	11	22	„ „
„ <i>Kon adzuki</i>	11	22	„ „
„ <i>Kuro-adzuki</i>	11	22	„ „
„ <i>Maruba</i>	11	22	„ „
„ <i>Midoriyogou</i>	11	22	„ „
„ <i>Natsu-adzuki</i>	11	22	„ „
„ <i>Shirosaya-aka</i>		22	„ „
„ <i>Wase-maruba</i>	11	22	„ „
„ <i>Yogore</i>	11	22	„ „
„ <i>multiflorus</i>		22	KUHN, 1929.
„ <i>mungo</i>		24	RAU, 1929b.
„ <i>radiatus</i>		24	„ „
„ <i>vulgaris</i>		22	KUHN, 1929.
<i>Vigna catiang</i> ³⁾		24	RAU, 1929b.
„ <i>catiang</i> var. <i>sinensis</i>		24	„ „
<i>Dolichos biflorus</i>		24	„ „
„ <i>Lab-lab</i>		24	„ „

GERANIALES

LINACEAE

<i>Linum angustifolium</i> HUDS. ⁴⁾	15	30-32	SIMONET, 1929e.
„ <i>perenne</i>	9		INOUE, 1929.
„ <i>usitatissimum</i>	6		„ „
„ <i>usitatissimum</i> L. ⁵⁾	15	30-32	SIMONET, 1929e.

ERYTHROXYLACEAE

<i>Erythroxylum Coca</i>		24	HEITZ, 1929a.
<i>Xanthoxylum piperitum</i> DC.	35 ⁶⁾		SINOTO, 1929b.

¹⁾ In some cases the 14 chromosomes were arranged as 5 double chromosomes on the equatorial plate, 4 chromosomes having joined to form one large ring.

²⁾ In heterotypic division the chromosomes were arranged as a ring of 4 + 5 pairs.

³⁾ Two different strains, one a low herb and the second a larger form, showed the same number of chromosomes.

⁴⁾ 4 lots of this species were examined.

⁵⁾ 35 varieties of this species were examined.

⁶⁾ In meiotic divisions of male flowers one large chromosome, behaving as a univalent, and a seemingly unequal pair were observed.

RUTACEAE		n	2n	
<i>Ruta patavina</i> L.	9	18	CAPPELLETTI, 1929.	
<i>Citrus</i> — „ <i>Fujii Wase Satsuma</i> ”	9		NAKAMURA, 1929.	
„ — „ <i>Owari Satsuma</i> ” . .	9 ¹⁾		„ ”	
„ — „ <i>Wase Satsuma</i> ” . .	9 ¹⁾		„ ”	
„ — „ <i>Yamada Wase Sat-</i> <i>suma</i> ”	9		„ ”	
EUPHORBIACEAE				
<i>Daphniphyllum macropodum</i>				
MIQ.	16 ²⁾		SINOTO, 1929b.	
<i>Mercurialis annua</i> ♂	8 ²⁾		SZTAJGERWALDOWNA, 1929.	
„ <i>leiocarpa</i> SIEB. et				
Zucc.	24		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.	
SAPINDALES				
ACERACEAE				
<i>Acer negundo</i> L.	13 ⁴⁾		SINOTO, 1929b.	
HIPPOCASTANACEAE				
Section <i>Euaesculus</i>				
<i>Aesculus glabra</i> WILLD. . . .	20		SKOVSTED, 1929.	
<i>Aesculus Hippocastanum</i> L. .	20		„ ”	
Section <i>Pavia</i>				
<i>Aesculus flava</i> AIT. (<i>A. lutea</i>				
WANGENTT. <i>A. octan-</i>				
<i>dra</i> MARSH.)	20		„ ”	
„ <i>pavia</i> L. (<i>Pavia ru-</i>				
<i>bra</i> POIR.)	20		„ ”	
Section <i>Macrothyrsus</i>				
<i>Aesculus parviflora</i> WALT. (<i>A.</i>				
<i>Macrostachya</i> MICHX.) . .	20		„ ”	
Hybrids:				
<i>A. mutabilis</i> Hort. = ? (<i>A. fla-</i>				
<i>va</i> × <i>A. pavia</i>)	20		„ ”	
<i>A. carnea</i> WILLD. (<i>A. rubicun-</i>				
<i>da</i> LODD.) (<i>A. Hippocasta-</i>				
<i>num</i> × <i>A. Pavia</i>)	40		„ ”	
BALSAMINACEAE				
<i>Impatiens Holstei</i>		16	HEITZ, 1929a.	

¹⁾ The behaviour of the reduction division of this species showed distinct irregularity especially in the heterotypic division. In homoeotypic division abnormalities were more seldom.

²⁾ An unequal pair of chromosomes was distinguishable in meiotic divisions of the male flowers.

³⁾ The chromosome complex is described as $7 + 2n$.

⁴⁾ An unequal pair of chromosomes was not always clearly distinguishable in meiotic divisions of male flowers.

BALSAMINACEAE (continued)	n	2n	
<i>Hydrocera trifoliata</i>		16	HEITZ, 1929a.
<i>Balsamina hortensis</i>	7	14	DE SOUZA VIOLANTE, 1929.
RHAMNALES			
RHAMNACEAE			
<i>Zizyphus vulgaris</i> LAM. var.			
<i>inermis</i> BUNGE	12		MORINAGA, FUKUSHIMA, KANÓ, MARUYAMA, YAMASAKI, 1929.
VITACEAE			
<i>Vitis aestivalis</i> probably			
	19		KOBEL, 1929a
" <i>amurensis</i>		38	NEBEL, 1929a, c; SAX, 1929b.
" <i>arizonica</i>		38	CHRISTOFF, 1929.
" <i>Berlandieri</i> 19 ¹⁾			KOBEL, 1929a.
" <i>Berlandieri</i> PLANCH. 19 ¹⁾			" 1929b.
" <i>bicolor</i> ca. 20			DORSEY, 1914.
" <i>Californica</i> 19 ²⁾			KOBEL, 1929a.
" <i>Californica</i> BENTH. 19 ²⁾			" 1929b.
" <i>cinerea</i> ENGELM. 19			" 1929a, b
" <i>cinerea</i>		38	SAX, 1929b.
" <i>coignitiae</i>		38	NEBEL, 1929a, c.
" <i>cordifolia</i> probably			
	19		KOBEL, 1929a.
" <i>coriacea</i>		30	CHRISTOFF, 1929.
" <i>doaniana</i>		30	" 1929.
" <i>doaniana</i>		38	NEBEL, 1929a, c.
" <i>Kaempferi</i>		38	SAX, 1929b.
" <i>Labrusca</i> ³⁾		38	NEBEL, 1929a, c; SAX, 1929b.
" <i>Labrusca</i> L. 19			KOBEL, 1929b.
" <i>Labrusca</i> var. <i>Adirondac</i> 19			HIRAYANAGI, 1929.
" <i>Labrusca</i> var. <i>Belle of Pipe</i>		38	SAX, 1929b.
" <i>Labrusca</i> var. <i>Campbell's</i>			
<i>Early</i> 19			HIRAYANAGI, 1929.
" <i>Labrusca</i> var. <i>Concord</i> 20			DORSEY, 1914.
" <i>Lincecumii</i>		38	CHRISTOFF, 1929.
" <i>Longii</i>		38	SAX, 1929b.
" <i>monticola</i>		38	CHRISTOFF, 1929.
" <i>riparia</i> 19 ⁴⁾			KOBEL, 1929a.

¹⁾ This determination was made from the observation of hybrid *V. Berlandieri* × *riparia* 420 A.M.G.

²⁾ This determination was made from the observation of hybrid *V. rupestris* × *V. californica*.

³⁾ Various collections were examined (NEBEL, 1929c).

⁴⁾ This determination was made from the observation of hybrids.

VITACEAE (continued)	n	2n
<i>Vitis</i> (continued)		
<i>Vitis riparia</i> MICH. (= <i>V. vulpina</i> L.)	19	KOBEL, 1929b.
„ <i>riparia</i> var. <i>Gloire de Montp.</i>	19	NEGRUL, 1929.
„ <i>riparia</i> <i>grand glabre</i>	19	KOBEL, 1929b; NEGRUL, 1929.
„ <i>riparia</i> var. <i>Scuppernon</i>	19	NEGRUL, 1929.
„ <i>rotundifolia</i>		40 SAX, 1929b.
„ <i>rubra</i>		38 CHRISTOFF, 1929.
„ <i>rupestris</i>		38 NEBEL, 1929a, c; SAX, 1929b.
„ <i>rupestris</i> var. <i>du Lot</i>	19	38 NEGRUL, 1929.
„ <i>rupestris</i> SCHEELE var. <i>metallica</i>	19	KOBEL, 1929a.
„ <i>rupestris</i> SCHEELE	19	„ 1929b.
„ <i>Solonis</i>		38 CHRISTOFF, 1929.
	19 ¹⁾	KOBEL, 1929a.
„ <i>Treleasi</i>		38 SAX, 1929b.
„ <i>vinifera</i>	ca. 20 ²⁾	DORSEY, 1914.
		38, 40 ³⁾ SAX, 1929b.
„ <i>vinifera</i> var. <i>Alemitchak</i>	19	NEGRUL, 1929.
„ <i>vinifera</i> var. <i>Black Hamburg</i>	19	HIRAYANAGI, 1929.
„ <i>vinifera</i> var. <i>Blauer Burgunder</i>	19	KOBEL, 1929b.
„ <i>vinifera</i> var. <i>Blauer Burgunder</i> (= <i>Klävner</i> = <i>Pinot noir</i>)	19	KOBEL, 1929a.
„ <i>vinifera</i> var. <i>Charbona</i>		38 SAX, 1929b.
„ <i>vinifera</i> var. <i>Chas. Ciotat</i>		38 „ „
„ <i>vinifera</i> var. <i>Cinsaut</i>		38 „ „
„ <i>vinifera</i> , var. <i>Classeias rose</i>	19	38 NEGRUL, 1929.
„ <i>vinifera</i> var. <i>Grand noir d. la C.</i>		38 „ 1928.
„ <i>vinifera</i> var. <i>Grüner Sylvaner</i>	19	KOBEL, 1929b.
„ <i>vinifera</i> var. <i>Grüner Sylvaner</i> (= <i>Oesterreicher</i>)	19	„ 1929a.
„ <i>vinifera</i> var. <i>Gutedel</i>	19	„ 1929b.
„ <i>vinifera</i> var. <i>Gutedel</i> (= <i>Chasselas</i>)	19	„ 1929a.

¹⁾ See foot-note 4 page 187.²⁾ This determination was made from observation of the hybrid *V. labrusca* × *V. vinifera* var. *Barry*.³⁾ One plant from China showed 40 chromosomes.

VITACEAE (continued)	n	2n	
<i>Vitis</i> (continued)			
<i>Vitis vinifera</i> var. <i>Koshu</i> . . .	19		HIRAYANAGI, 1929.
" <i>vinifera</i> var. <i>Koshu-san-jaku</i>	19		" "
" <i>vinifera</i> var. <i>Malaga bleu</i> . . .	19		NEGRUL, 1929.
" <i>vinifera</i> var. <i>Muscat Hamburg</i>	19		" 1929.
" <i>vinifera</i> var. (<i>Riesling</i> × <i>Sylvaner</i>) = " <i>Müller Thurgau-rebe</i> ".	19	38	SAX, 1929b.
" <i>vinifera</i> var. <i>Otshanure Sapere</i>	19		KOBEL, 1929a, b.
" <i>vinifera</i> var. <i>Plávai</i> . . .	19	38	NEGRUL, 1929.
" <i>vinifera</i> var. <i>Rka-tzitel</i> (<i>Kahetia</i>)	19		" "
" <i>vinifera</i> var. <i>Rka-tzitel</i> (<i>Kutais</i>)	19		" "
" <i>vinifera</i> var. <i>Ryugan</i> . .	19		HIRAYANAGI, 1929.
" <i>vinifera</i> var. <i>Saltaniana</i> .	19		" "
" <i>vinifera</i> var. <i>Sereksia</i> . .	19		NEGRUL, 1929.
" <i>vinifera</i> var. <i>Yenshin</i> . .	19		HIRAYANAGI, 1929.
" <i>vulpina</i>	20		DORSEY, 1914.
	19		HIRAYANAGI, 1929.
		38	NEBEL, 1929c; SAX, 1929b.
<i>Vitis</i> varieties:			
<i>Andersonii</i> (<i>vulpina</i> × <i>Kaempferi</i>)		38	SAX, 1929b.
<i>Bacchus</i>		38	NEBEL, 1929a, c.
<i>Barry</i> (<i>V. labrusca</i> × <i>V. vinifera</i>)	20		DORSEY, 1914.
<i>Brighton</i>		38	NEBEL, 1929a, c.
<i>Brighton</i> (<i>Concord</i> × <i>Diana Hamburg</i>)	20		DORSEY, 1914.
<i>Catawba</i>		38	NEBEL, 1929a, c.
<i>Champinii</i> (<i>candicans</i> × <i>rupestris</i> or <i>Berlandieri</i>) . .		38	SAX, 1929b.
<i>Charas</i>	20		PARÄUSKAJA, 1929 ¹).
<i>Clinton</i>		38	NEBEL, 1929a, c.
<i>Clinton</i> (<i>riparia</i> , <i>labrusca</i>) .		38	SAX, 1929b.
<i>Couderc</i> 12	19		NEGRUL, 1929.

¹) As reported by NEGRUL (1929) — PARÄUSKAJA (1929). Proc. U.S.S.R. Congress Genetics, Plant & Animal Breeding.

VITACEAE (continued)	n	2n	
<i>Vitis</i> varieties (continued)			
Couderc 7120 (<i>lincecum</i> , <i>rupestris</i> , <i>vinifera</i>)		38	NEGRUL, 1929.
Daroi	20		PARÄUSKAJA, 1929 ¹⁾ .
Delaware	19		HIRAYANAGI, 1929.
Delaware (<i>labrusca</i> , <i>Bourguigniana</i> , <i>vinifera</i>)		38	SAX, 1929b.
Dunkirk		38	NEBEL, 1929a, c.
Fredonia		38	" "
Iona	19		HIRAYANAGI, 1929.
Katta-Kuran	20		PARÄUSKAJA, 1929 ¹⁾ .
Keuka		38	NEBEL, 1929a, c.
Moore Early		38	" "
Muskat		38	" "
Muskat gigas		76	" "
Nemrang	20		PARÄUSKAJA, 1929 ¹⁾ .
Niagara		38	NEBEL, 1929a, c.
Niagara (<i>labrusca</i> , <i>vinifera</i>)		38	SAX, 1929b.
Ontario		38	NEBEL, 1929c.
Portland		38	" "
Seibel I	19		NEGRUL, 1929.
Seibel 28 (<i>rupestris</i> , <i>lincecum</i> , <i>vinifera</i>)	19		" "
Sheridan		38	NEBEL, 1929a, c.
Slavinii (<i>vulpina</i> × <i>Leontiana</i>)		38	SAX, 1929b.
Sultanina		38	NEBEL, 1929a, c.
Sultanina gigas		76	" "
Washington	19		HIRAYANAGI, 1929.
<i>Vitis aestivalis</i> × <i>V. riparia</i> (Azemar Mdt.) ²⁾ . . . probably			
	19		KOBEL, 1929a.
" <i>Berlandieri</i> × <i>V. riparia</i>	19		NEGRUL, 1929.
" <i>Berlandieri</i> × <i>V. riparia</i> 420 A. M. G.	19		KOBEL, 1929a, b.
" <i>cordifolia</i> × (<i>V. riparia</i> × <i>rupestris</i>) 13 A. ²⁾ . . . probably			
	19		" 1929a.
" <i>riparia</i> × <i>V. rupestris</i> 3309 Coud.	19	38	NEGRUL, 1929.
" <i>riparia</i> × <i>V. rupestris</i> 3310 Coud.	19		" "

¹⁾ See foot-note page 189.²⁾ No clear plates of this hybrid were seen. Reduction division proceeded in a normal way.

VITACEAE (continued)	n	2n
<i>Vitis</i> (continued)		
<i>Vitis riparia</i> × <i>V. vinifera</i> var.		
Gamay 595 Oberlin . . .	19	KOBEL, 1929a, b.
" <i>rupestris</i> × <i>V. aestivalis</i>		
12A ¹⁾ probably		
	19	" 1929a.
" <i>rupestris</i> × <i>V. Californica</i>	19	" 1929a, b.
" <i>rupestris</i> × <i>Chasselas rose</i>		
Coud. 4401	19	NEGRUL, 1929.
" <i>Solonis</i> × <i>V. riparia</i> 1616		
Coud. ¹⁾ probably		
	19	KOBEL, 1929a.
" <i>vinifera</i> var. <i>Cabernet</i> ×		
<i>V. Berlandieri</i> 333 E. M.	19	" 1929a, b.
" <i>vinifera</i> var. <i>Mourvèdre</i>		
× <i>V. rupestris</i> 1202 Coud.	19	" 1929a, b.
<i>Ampelopsis acontifolia</i>		40 CHRISTOFF, 1929.
<i>Ampelopsis brevipedunculata</i> .		40 SAX, 1929b.
<i>Ampelopsis cordata</i>		40 " "
<i>Ampelopsis humulifolia</i>		40 " "
<i>Ampelopsis serjaniaefolia</i> . .	20	40 CHRISTOFF, 1929.
<i>Ampelopsis vitifolia</i>		40 " "
<i>Parthenocissus quinquefolia</i> .		40 SAX, 1929b.
<i>Parthenocissus tricuspidata</i> .		40 " "
<i>Parthenocissus vitacea</i>		40 " "

MALVALES

MALVACEAE

GOSSYPIMUM

Acclimatized American cottons

Gossypium hirsutum MILL.

C. O. I. (from Cotton Specia-

list Gov't. of Madras) . . .

26

BANERJI, 1929.

440 (from Gov't. Expt. Sta.

Dhulia-Cambodia cotton) .

26

" "

4F. (Punjab selection of

American cotton)

26

" "

Buri (from Central Provinces)

26

" "

Herbaceum cottons

Gossypium herbaceum LINN.*Hagari* 25 (from Cotton Spe-

cialist Gov't. of Madras) .

13

" "

¹⁾ No clear plates of this hybrid were seen. Reduction division proceeded in a normal way.

MALVACEAE (continued)	n	2n
<i>Gossypium herbaceum</i> LINN. (continued)		
<i>Kumpla</i> (from Cotton Botanist, Mysore Dept. of Agr.)	13	BANERJI, 1929.
<i>Mysore Local</i> (<i>G. herbaceum</i> var. nov. <i>melanosperma</i>) .	13	" "
<i>Dharwar I</i> (from Gov't. Expt Sta. Dharwar)	13	" "
<i>Broach</i> No. 6 (from Bombay Dept. Agr. Poona) . . .	13	" "
<i>Goghari</i> (A. 26) (from Bombay Dept. Agr. Poona) .	13	" "
I. A. <i>Cylindrical Boll</i> (from Bombay Dept. Agr. Poona)	13	" "
I. A. <i>Long Boll</i> (from Bombay Dept. of Agr. Poona)	13	" "
<i>Wagad</i> (8) (from Bombay Dept. Agr. Poona) . . .	13	" "
1027 A. L. F. (from Bombay Dept. Agr. Poona) . . .	13	" "
The Indicum cottons		
<i>Gossypium indicum</i> LAMK.		
<i>Bani</i> (Hyderabad) (from the Dept. Agr. Hyderabad)	13	" "
<i>Bani</i> (Nagpur) (from the botanist to C. P. Gov't. Nagpur)	13	" "
<i>Mungari</i> 274 (from the Expt Sta. Hagari)	13	" "
<i>Nandayal</i> 14 (from the cotton specialist, Gov't. Madras).	13	" "
<i>Goindicum</i> var. nov. <i>Molli-soni</i> (Gammie) from Punjab Dept. Agr.	13	" "
The Neglectum cottons		
<i>Gossypium neglectum</i> TOD.		
<i>Gossypium neglectum</i> var. nov. <i>rosea</i> ¹⁾ (GAMMIE) . . .	13	" "
<i>Gossypium neglectum</i> sub var. nov. <i>Malvensis</i> (GAMMIE) ²⁾ .	13	" "

¹⁾ From Gov't. Expt. Station Dharwar.²⁾ From Economic Botanist to C. P. Gov't. Nagpur.

MALVACEAE (continued)	n	2n	
<i>Gossypium neglectum</i> TOD. (continued)			
<i>Gossypium neglectum</i> var.			
nov. <i>vera</i> (GAMMIE) ¹⁾ . . .	13		BANERJI, 1929.
<i>Gossypium neglectum</i> subvar			
nov. <i>cutchica</i> (GAMMIE) ¹⁾ . . .	13		" "
<i>Gossypium neglectum</i> subvar.			
nov. <i>Kathiararensis</i> (GAM-			
MIE) ²⁾	13		" "
<i>Gossypium neglectum</i> (naked			
seeds) ³⁾	13		" "
W. N. 27 (selection of <i>ne-</i>			
<i>glectum roseum</i>)	13		" "
<i>Wagale</i> (yellow flowered) ⁴⁾ . . .	13		" "
<i>Wagale</i> C. (pale yellow-flow-			
ered) ⁵⁾	13		" "
<i>Gossypium arboreum</i> WATT ⁶⁾	13		" "
" <i>arboreum</i> var. <i>san-</i>			
<i>guinea</i> WATT ⁶⁾	13		" "
" <i>cernuum</i> TOD. ²⁾	13		" "
" <i>obtusifolium</i> GAM-			
MIE (Nadam) ⁷⁾	13		" "
PARIETALES			
THEACEAE			
<i>Thea sinensis</i> L.	15		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
VIOLACEAE			
<i>Viola odorata</i>	10		GORCZYNSKI, 1929.
" <i>odorata</i> var. <i>praecox</i> G. .	9		MADGE, 1929.
Section <i>Nominium</i>			
<i>Viola adunca</i> J. E. SMITH (= <i>V.</i>			
<i>rupestris</i> SCHMIDT sub-			
species)	10 ⁸⁾		CLAUSEN, 1929.
" <i>papilionacea</i> ⁹⁾	26		" "
" <i>rupestris</i> SCHMIDT var.			
<i>arenaria</i> (D. C.) G. BECK		20	" "
" <i>sepincola</i> FORD	16		" "

¹⁾ See foot-note 2 page 192.²⁾ From the Expt. station Dhulia.³⁾ Seeds sent by the Cotton Botanist, Sind.⁴⁾ See foot-note 1 page 192.⁵⁾ Isolated by the Cotton Breeder Dhulia.⁶⁾ From the Cotton Botanist to the Gov't. of Punjab. Lyallpur.⁷⁾ From the Cotton Specialist Gov't of Madras.⁸⁾ Two different types were examined.⁹⁾ This species was called *V. cucullata* in CLAUSEN 1927b.

VIOLACEAE (continued)		n	2n	
Section <i>Nominium</i> (continued)				
<i>Viola</i> (continued)				
<i>Viola striata</i> AIT.	10			CLAUSEN, 1929.
„ <i>uliginosa</i> BESS.	10			„ „
Section <i>Chamaemelianum</i>				
<i>Viola chrysantha</i> HOOK.	12			„ „
„ <i>glabella</i> NUTT.	12			„ „
„ <i>ocellata</i> TORR. et GRAY	6			„ „
„ <i>pedunculata</i> TORR. et GRAY	6			„ „
„ <i>pubescens</i> AIT.		12		„ „
„ <i>purpurea</i> KELL.		24? ¹⁾		„ „
„ <i>sarmentosa</i> DOUGH.	12			„ „
Section <i>Melianum</i>				
„ <i>nana</i> D. C.		48 ²⁾		„ „
„ <i>Rafinesquie</i> GREENE	17			„ „
„ <i>rothomagensis</i> DESF.	17			„ „
VIOLA ³⁾				
Section <i>Nominium</i>				
A. <i>Curvo pedunculata</i>				
<i>Viola nipponica</i> MAXIM. („Aoi-sumire”)	10			MIYAJI, 1929.
„ <i>odorata</i> L.	10			„ „
B. <i>Mirabiles</i>				
<i>Viola mirabilis</i> L. („Ibuki-sumire”)		20		„ „
C. <i>Silvestres</i>				
<i>Viola Faurieana</i> W. BCKR. („Teriha-tatitubo-sumire”)		20		„ „
„ <i>grypoceras</i> A. GRAY („Tatitubo-sumire”)	10	20		„ „
„ <i>lutchuensis</i> NAKAI („Ryûkû-tatitubo-sumire”)	10	20		„ „
„ <i>obtusâ</i> Makino („Ni-oi-tatitubo-sumire”)		20		„ „

¹⁾ Not greater than 25 and not less than 23.²⁾ Not greater than 48 and not less than 46.³⁾ The classification of species studied by MIYAJI is according to BECKER (ENGLER and PRANTL, 2nd Edition) and NAKAI.

VIOLACEAE (continued)		n	2n		
Viola (continued)					
C. <i>Silvestres</i> (continued)					
<i>Viola ovato-oblonga</i> MAKINO („Nagabano-tatitubo-sumire“).			20	MIRAJI, 1929.	
„ <i>pruniflora</i> NAKAI („Yamazakura-sumire“).			20	„	„
„ <i>rostrata</i> MUHL. („Nagabaoi-sumire“). .			20	„	„
„ <i>sachalinensis</i> BOISS. (Kôrai-tatitubo-sumire“).	10	20	„	„	
„ <i>yakushimana</i> NAKAI („Koke-sumire“)		20	„	„	
D. <i>Caninae</i>					
<i>Viola micrantha</i> TURCZ. (Yezo-no-tatitubo-sumire“)	10		„		
„ <i>Raddeana</i> REGEL („Tati-sumire“) .		20	„	„	
„ <i>Thibaudieri</i> FRANCH. et SAVAT. („Tadesumire“)	10	20	„	„	
E. <i>Bilobatae</i>					
<i>Viola fibrillosa</i> W. BCKR. (Miyama-tubo-sumire)	12		„	„	
„ <i>verecunda</i> A. GRAY („Tubo-sumire“) .	12	24	„	„	
„ <i>verecunda forma radicans</i> MAKINO („Hai-tubo-sumire“)	12		„	„	
„ <i>verecunda</i> var. <i>semilunaris</i> MAXIM. („Agi-sumire“) . .		24	„	„	
F. <i>Umbrosae</i>					
<i>Viola Boissieuana</i> MAKINO („Hime-Miyama-sumire“) . . .		24	„	„	
„ <i>Maximowicziana</i> MAKINO („Ko-Miyama-sumire“) . .		24	„	„	

VIOLACEAE (continued)	n	2n		
VIOLA (continued)				
F. <i>Umbrosae</i> (continued)				
<i>Viola obtusosagittata</i>				
KOIDZ. („Hosoba-sumire”)		24	Miyaji, 1929.	
„ <i>okuboi</i> MAKINO („Ke-maruba-sumire”)	12		„	„
„ <i>okuboi</i> var. <i>glabra</i> MAKINO (Maruba-sumire”)	12		„	„
„ <i>Selkirkii</i> PURSH. („Miyama-sumire”)		24	„	„
„ <i>Takedana</i> MAKINO („Hina-sumire”)	12		„	„
„ <i>Takedana</i> var. <i>variegata</i> NAKAI (Huri-hina-sumire”)	12		„	„
„ <i>Tanakacana</i> MAKINO („Sinano-sumire”)		24	„	„
„ <i>variegata</i> FISCH. („Genzi-sumire”)	12	24	„	„
„ <i>violacea</i> MAKINO („Sihai-sumire”)		24	„	„
„ <i>yezoensis</i> MAKINO („Hikaje-sumire”).		24	„	„
G. <i>Plagiostigma</i>				
<i>Viola boninensis</i> NAKAI („Atuba-sumire”)	24	48	„	„
„ <i>chaerophylloides</i> W. BCKR. („Higo-sumire”)	12		„	„
„ <i>eizanensis</i> MAKINO („Eizan-sumire”)		24	„	„
„ <i>eizanensis</i> var. <i>simplicifolia</i> MAKINO („Hitotuba-yezo-sumire”)	12	24	„	„
„ <i>hirtipes</i> S. MOORE („Sakura-sumire”)	12	24	„	„
„ <i>japonica</i> LANGSD. („Ko-sumire”)	24	48	„	„
„ <i>kisoana</i> NAKAI („Kiso-sumire”)		36	„	„

VIOLACEAE (continued)	n	2n		
VIOLA (continued)				
G. <i>Plagiostigma</i> (continued)				
<i>Viola lactiflora</i> NAKAI				
(„Siro-ko-sumire")	24		MIYAJI, 1929.	
„ <i>mandschurica</i> W.				
BCKR. ¹⁾ („Sumire")	24	48	„	„
„ <i>mandschurica</i> var.				
<i>albescens</i> NAKAI ²⁾				
(„Ko-sirobana-				
sumire")	36		„	„
„ <i>mandschurica</i> var.				
<i>ciliata</i> NAKAI („Ke-				
sumire")		48	„	„
„ <i>Miyajiana</i> KOIDZ.				
(„Suwa-sumire") .		24	„	„
<i>multifida</i> MAKINO				
(„Kikuba-sumire")		24	„	„
„ <i>oblongo-sagittata</i>				
NAKAI („Ryûkyû-				
siro-sumire") . . .		72	„	„
„ <i>Patrini</i> DC. ³⁾ („Ye-				
zo-sirobana-sumi-				
re")	12		„	„
„ <i>phalacrocarpa</i> MA-				
XIM. („Akane-su-				
mire")	12		„	„
„ <i>phalacrocarpoides</i>				
MAXIM. („Oka-				
sumire")		24	„	„
„ <i>pseudo-japonica</i> NA-				
KAI („Ryûkyû-ko-				
sumire")		24	„	„
H. <i>Stolonosae</i>				
<i>Viola shikokiana</i> MAKINO				
(„Sikoku-sumire").		24	„	„
I. <i>Vaginatae</i>				
<i>Viola Bisseti</i> MAXIM.				
(„Nagaba-no-sumi-				
re-saisin") . . .		24	„	„
„ <i>Rossii</i> HEMS. („A-				
kebono-sumire") .		24	„	„

¹⁾ This species was previously (MIYAJI 1913) included by the name *V. Patrini* var. *chinensis* but is now considered as an independent species.

²⁾ This species is the same as the one previously named *V. Patrini* (n = 36?).

³⁾ This species is quite different from the one previously named *V. Patrini* (n = 36?).

VIOLACEAE (continued)	n	2n	
VIOLA (continued)			
I. <i>Vaginatae</i> (continued)			
<i>Viola vaginata</i> MAXIM. („Sumire-saisin”) .		24	MIRAJI, 1929.
K. <i>Langsdorffianae</i>			
<i>Viola Langsdorffii</i> FISCH. („Öba-tatitubo- sumire”)		96	„ „
L. <i>Diffusae</i>			
<i>Viola diffusa</i> GING. („Tu- kusi-sumire”) . .	13	26	„ „
M. <i>Boreali-Americanae</i>			
<i>Viola cucullata</i> AIT. . .		54	„ „
Section II. <i>Dischidium</i>			
<i>Viola biflora</i> L. („Kibana-no- Komanotume”) . . .	6		„ „
„ <i>crassa</i> MAKINO („Takana- sumire”)	24	48	„ „
Section III. <i>Chamaemelum</i>			
<i>Viola alliariaefolia</i> NAKAI („Zin' yô-ki-sumire”) .		12	„ „
„ <i>brevistipulata</i> W. BCKR. ¹⁾	6		
„ <i>kishidai</i> NAKAI		12	„ „
CARICACEAE			
<i>Carica papaya</i> LINN.	9		ASANA & SUTARIA, 1929.
DATISCEAE			
<i>Datisca cannabina</i> L.		11 ²⁾	SINOTO, 1929b.
OPUNTIALES			
CACTACEAE			
<i>Mamillaria</i> sp.	11		ISHII, 1929.
MYRTIFLORAE			
LYTHRACEAE			
<i>Lythrum hyssopifolia</i>	10		TISCHLER, 1929a.
„ <i>salicaria</i>	25		„ „
„ <i>salicaria</i> var. <i>vulgare</i>			
D. C. subvar. <i>genuina</i> KOEHNE. 14 ³⁾ , 15			SHINKE, 1929.
PUNICACEAE			
<i>Punica Granatum</i> L.	8		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.

¹⁾ This species is the same as the one previously called *V. glabella*.

²⁾ An unequal pair (much smaller than the others) of chromosomes was distinguishable in meiotic divisions of the male flowers.

³⁾ One chromosome in this complex was tetrapartite.

MYRTACEAE	n	2n	
<i>Myrtis communis</i> L.	11		GRECO, 1929.
OENOTHERACEAE			
<i>Zauschneria californica</i> ¹⁾ . . .	78, 15, 30		JOHANSEN, 1929b.
„ <i>californica</i> PRESL.	7, 8, 15		„ 1929c.
„ <i>canescens</i>		ca. 30	„ 1929b.
„ <i>microphylla</i>		ca. 30	„ „
<i>Epilobium angustifolium</i>	18		„ „
„ <i>angustifolium</i> L.	18	36	„ 1929c.
„ <i>californicum</i>	18		JOHANSEN, 1929b.
„ <i>californicum</i> HAUSK.	18	36	„ 1929c.
„ <i>obcordatum</i>	18		„ 1929b.
„ <i>obcordatum</i> GRAY	18	36	„ 1929c.
„ <i>paniculatum</i>	18		„ 1929b.
„ <i>paniculatum</i> NUTT.	18	36	„ 1929c.
„ <i>paniculatum</i> var. <i>ju-</i> <i>cundum</i>	18		„ 1929b.
„ <i>paniculatum</i> var. <i>ju-</i> <i>cundum</i> TREL.	18	36	„ 1929c.
„ <i>watsoni</i> var. <i>francis-</i> <i>canum</i>	18		„ 1929b.
„ <i>watsoni</i> BARBEY var. <i>franciscanum</i> JEP- SON	18	36	„ 1929c.
<i>Boisduvalia glabella</i> var. <i>cam-</i> <i>pestris</i>	7		„ 1929b.
„ <i>glabella</i> WALP. var. <i>campestris</i> JEP- SON	7 ²⁾	14	„ 1929c.
<i>Clarkia elegans</i>	3-13	7-22	„ 1929b.
„ <i>elegans</i> DOUGL.	3-11 ³⁾	7-22	„ 1929c.
	4-13		BURLINGAME given by JOHAN-
			SEN, 1929c.
„ <i>pulchella</i>	4-14	8-16	JOHANSEN, 1929b.
„ <i>pulchella</i> PURSH.	7 ³⁾	8-16	„ 1929c.
„ <i>rhomboidea</i>	7, 9		„ 1929b.
„ <i>rhomboidea</i> DOUGL.	9	18	„ 1929c.
„ <i>concinna</i> (= <i>Euchari-</i> <i>dium concinnum</i>)	7	14	„ 1929c.
<i>Eucharidium concinnum</i>	7		„ 1929b.
<i>Godetia amoena</i>	7		„ 1929b.

¹⁾ Several forms were examined.²⁾ 4, 5 and 6 haploid chromosomes were sometimes counted.³⁾ The number 7 was constant in meiotic divisions giving rise to megaspores.

OENOTHERACEAE (continued)	n	2n	
<i>Godetia</i> (continued)			
<i>Godetia amoena</i> (LEHM) LILJA .	7	14	JOHANSEN, 1929c.
" <i>amoena</i> var. <i>lindleyi</i> .	7		" 1929b.
" <i>amoena</i> var. <i>lindleyi</i>			
JEPSON	7	14	" 1929c.
" <i>deflexa</i>	ca. 9		" 1929b.
" <i>quadrivulnera</i>		14	" 1929b.
" <i>quadrivulnera</i> (DOUGL.)			
SPACH		14	" 1299c.
<i>Onagra hookeri</i>	7		" 1929b.
<i>Oenothera ammophila</i>	14 ¹⁾		SHEFFIELD, 1929.
	$\frac{2}{2}$		
" <i>angustissima</i>	14 ²⁾		GATES & SHEFFIELD, 1929.
	$\frac{2}{2}$		
" <i>Cockerelli</i>	14 ²⁾		CLELAND & OEHLKERS, 1929.
	$\frac{2}{2}$		
" <i>seg. deserens</i>	14 ³⁾		ILLICK, 1929.
	$\frac{2}{2}$		
" <i>eriensis</i>	14 ²⁾		GATES & SHEFFIELD, 1929.
	$\frac{2}{2}$		
		14	GATES, 1929.
" <i>fragilis</i>	7		HOEPPENER & RENNER, 1929.
" <i>franciscana</i>	14 ⁴⁾		" " "
	$\frac{2}{2}$		
" <i>franciscana</i> BARTLETT	7 ⁵⁾		KULKARNI, 1929b.
" <i>franciscana sulfurea</i>	7		ILLICK, 1929.
" <i>grandiflora</i> DE VRIES	14 ³⁾		CLELAND & OEHLKERS, 1929.
	$\frac{2}{2}$		
" <i>grandiflora</i> B.	7		ILLICK, 1929.
" <i>Hookeri</i>	7		CLELAND & OEHLKERS, 1929;
			HOEPPENER & RENNER, 1929.
" <i>ingeminans</i> mut. <i>quadrata</i>		21	DULFER given by DE VRIES, 1929.
" <i>Lamarckiana</i> ⁶⁾	14 ¹⁾		ILLICK, 1929; RUDLOFF, 1929b;
	$\frac{2}{2}$		CLELAND & OEHLKERS, 1929.
	14 ¹⁾	14	CLELAND, 1929.
	$\frac{2}{2}$		

¹⁾ Arranged as a ring of 12 + 1 pair.²⁾ Arranged as a ring of 14.³⁾ Arranged as a circle of 6 + 4 pairs.⁴⁾ Arranged as a ring of 4 + 5 pairs.⁵⁾ Arranged as a closed chain of 4 + 5 ring shaped pairs of bivalents at second contraction but as 7 pairs at metaphase.⁶⁾ Plants from 3 different sources were examined by CLELAND (1929) — Princeton material, the *r-Lamarckiana* of RENNER (white-nerved *Lamarckiana* of HERIBERT NILSSON) and the original strain of DE VRIES.

OENOTHERACEAE (continued)	n	2n	
<i>Oenothera</i> (continued)			
<i>Oenothera Lamarckiana albicans</i>	14 ¹⁾ $\frac{2}{2}$		RUDLOFF, 1929b.
„ <i>Lamarckiana cruciata</i>	14 ²⁾ $\frac{2}{2}$		CLELAND & OEHLKERS, 1929.
„ <i>Lamarckiana cucumis</i>	15		DULFER given by DE VRIES, 1929.
„ <i>Lamarckiana flava</i> .	14 ³⁾ $\frac{2}{2}$		RUDLOFF, 1929b.
„ <i>Lamarckiana gigas</i> .	28 ⁴⁾ $\frac{2}{2}$		HOEPPENER & RENNER, 1929.
„ <i>Lamarckiana lingua</i>	15		DULFER given by DE VRIES, 1929.
„ <i>Lamarckiana opaca</i> .	15		DULFER given by DE VRIES, 1929.
„ <i>Lamarckiana purpurata</i>	7		RUDLOFF, 1929b.
„ <i>Lamarckiana rubri-</i> <i>caulis</i>	14 ⁵⁾ $\frac{2}{2}$		„ „
„ <i>Lamarckiana semigi-</i> <i>gas</i>	21 $\frac{2}{2}$		DULFER given by DE VRIES, 1929.
„ <i>lutescens</i> (= sp. <i>fla-</i> <i>vens</i> sp. <i>flavens</i>) . .	7		HOEPPENER & RENNER, 1929.
„ <i>muricata</i>		14	HEITZ, 1929a.
„ <i>Novae-Scotiae</i> . . .	14 ¹⁾ $\frac{2}{2}$		SHEFFIELD, 1929.
„ <i>nutans</i>	14 ¹⁾ $\frac{2}{2}$		CATCHESIDE given by GATES & SHEFFIELD, 1929.
„ <i>mut. pervirens</i> . . .	14 ⁶⁾ $\frac{2}{2}$		ILLICK, 1929.
„ <i>pratincta</i>	14 ²⁾ $\frac{2}{2}$		„ „
„ <i>pratincta</i> mut. <i>for-</i> <i>mosa</i>	14 ¹⁾ $\frac{2}{2}$		KULKARNI given by BLAN- CHARD, 1929.
	14 ⁷⁾ $\frac{2}{2}$	14	KULKARNI, 1929a.

¹⁾ Arranged as a ring of 14.

²⁾ Arranged as a ring of 12 + 1 pair.

³⁾ Arranged as 2 rings of 4 and one of 6.

⁴⁾ Arranged as a chain of 24 and 2 pairs.

⁵⁾ Arranged as a ring of 8 and one of 6.

⁶⁾ Arranged as a circle of 12 + 1 pair or as 7 pairs.

⁷⁾ In a small percentage of cases the distribution of chromosomes in heterotypic metaphase was irregular and 6 went to one pole and 8 to the other. A circle of 14 in diakinesis.

OENOTHERACEAE (continued)	n	2n	
<i>Oenothera</i> (continued)			
<i>Oenothera pratincola</i> strain C. .	14 ¹⁾ $\frac{2}{2}$		KULKARNI, 1929a.
" <i>pratincola</i> strain E. .	14 ¹⁾ $\frac{2}{2}$	14	" "
" <i>pratincola</i> strain M. (<i>O. pratincola</i> mut. <i>formosa</i> × strain C.) F ₂	14 ²⁾ $\frac{2}{2}$		" "
" <i>pratincola</i> mut. <i>reci- diva</i>	14 ³⁾ $\frac{2}{2}$		" 1929c.
" <i>pratincola</i> mut. <i>simu- lans</i>	14 ⁴⁾ $\frac{2}{2}$		" "
" <i>pratincola</i> gray dwarf	7		" "
" <i>pratincola</i> αα hybrid	14 ⁵⁾ $\frac{2}{2}$		" "
" <i>pratincola</i> ββ hybrid	14 ⁶⁾ $\frac{2}{2}$		" "
" <i>pratincola</i> hybrid <i>re- cidiva</i> with red buds	14 ⁴⁾ $\frac{2}{2}$		" "
" <i>pratincola</i> hybrid <i>si- mulans</i> with green buds	14 ⁴⁾ $\frac{2}{2}$		" "
" <i>purpurata</i> KLEBAHN	7		RUDLOFF, 1929a.
" <i>pycnocarpa</i>	14 ⁴⁾ $\frac{2}{2}$		CATCHESIDE given by GATES & SHEFFIELD, 1929.
" <i>rubricalyx</i>	14 ⁷⁾ $\frac{2}{2}$		SHEFFIELD, 1929.
" <i>rubricalyx sulfurea</i> .	7	14	GATES, 1929. ILLICK, 1929.

¹⁾ See foot-note 7 page 201.²⁾ In diakinesis a circle of 12 + a ring of 2.³⁾ Arranged usually as a closed chain of 14 chromosomes but occasionally as an open chain.⁴⁾ Arranged as a ring of 14.⁵⁾ Arranged as an open or closed chain of 10 + 2 ring shaped pairs of chromosomes.⁶⁾ Arranged as a chain of 4 + 5 pairs during the late second contraction stage and in diakinesis either as such or as 7 pairs.⁷⁾ Arranged as a circle of 6 + 4 pairs.

OENOTHERACEAE (continued)	n	2n
<i>Oenothera</i> (continued)		
<i>Oenothera rubricaulis</i> KLEBAHN	14 ¹⁾ $\frac{2}{2}$	RUDLOFF, 1929a.
„ <i>strigosa</i>	14 ²⁾ $\frac{2}{2}$	CLELAND & OELKERS, 1929.
„ <i>suaveolens</i> (yellow) .	14 ³⁾ $\frac{2}{2}$	ILICK, 1929; CLELAND & OELKERS, 1929.
„ <i>suaveolens</i> (sulphur)	14 ³⁾ $\frac{2}{2}$	ILICK, 1929; CLELAND & OELKERS, 1929.
„ <i>ingeminans</i> mut. <i>quadrata</i>	21	DULFER given by DE VRIES, 1929.
„ <i>ingeminans</i> mut. <i>quadrata</i> × <i>O. (biennis)</i> × <i>Lamarckiana</i> laeta progeny.		
A. <i>Oenothera Lamarckiana ingeminans</i>	14	DULFER „ „ „ „ 1929.
B. Primary mutants:		
<i>Cana</i>	15	DULFER „ „ „ „ 1929.
<i>Lata</i>	15	DULFER „ „ „ „ 1929.
<i>Liquida</i>	15	DULFER „ „ „ „ 1929.
<i>pallescens</i>	15, (17)	DULFER „ „ „ „ 1929.
<i>pulla</i>	15, (16)	DULFER „ „ „ „ 1929.
<i>scintillans</i>	15, (18)	DULFER „ „ „ „ 1929.
<i>spathulata</i>	15 (16, 17)	DULFER „ „ „ „ 1929.
Accessory mutants:		
<i>albida</i>	15	DULFER „ „ „ „ 1929.
<i>oblonga</i>	15	DULFER „ „ „ „ 1929.
<i>persicaria</i>	15	DULFER „ „ „ „ 1929.

¹⁾ Arranged as a ring of 8 and one of 6.²⁾ Arranged as a ring of 14.³⁾ Arranged as a ring of 12 + 1 pair.

OENOTHERACEAE (continued)		n	2n
<i>Oenothera</i> (continued)			
<i>Oenothera ingeminans</i> mut. <i>quadrata</i> × <i>O. (biennis</i> × <i>Lamarchiana)</i> <i>lata</i> progeny.			
C. Secondary mutants.			
<i>acuminata</i>	19	DULFER given by DE VRIES,	
		1929.	
<i>Hamata</i>	16	DULFER " " " "	
		1929.	
<i>Lata minor</i>	15, 16, 17	DULFER " " " "	
		1929.	
<i>Latifolia</i>	16	DULFER " " " "	
		1929.	
<i>Lingua</i>	15	DULFER " " " "	
		1929.	
<i>militaris</i>	16, 17	DULFER " " " "	
		1929.	
<i>planifolia</i>	15	DULFER " " " "	
		1929.	
<i>rotunda</i>	16	DULFER " " " "	
		1929.	
<i>synedra</i>	17	DULFER " " " "	
		1929.	
D. <i>Oenothera</i> — (tetraploid form)			
	26	DULFER " " " "	
		1929.	
" <i>compressa</i> (progeny of tetraploid form n = 26)	28	HEYN given by DE VRIES, 1929.	
<i>Oenoihera ammophila</i> × <i>O. eriensis</i>	$\frac{14^1}{2}$	SHEFFIELD, 1929.	
" <i>ammophila</i> × <i>O. Novae-Scotiae</i>	$\frac{14^1}{2}$	" "	
" <i>ammophila</i> × <i>O. rubricalyx</i>	$\frac{14^2}{2}$	" "	
" (<i>biennis</i> × <i>Hookeri</i>) <i>albata</i> F ₁	$\frac{14^3}{2}$	HOEPPENER & RENNER, 1929.	

¹) Arranged as a ring of 14 as in the pollen parent.

²) Arranged as a ring of 6 + 4 pairs as in the pollen parent.

³) Arranged as a chain of 14.

OENOTHERACEAE (continued)	n	2n	
<i>Oenothera</i> (continued)			
<i>Oenothera Cockerelli</i> × <i>suaveo-</i>			
<i>lens</i>	14 ¹⁾	$\frac{2}{2}$	CLELAND & OELKERS, 1929.
" <i>eriensis</i> × <i>O. ammo-</i>			
<i>phila</i>	14 ²⁾	$\frac{2}{2}$	SHEFFIELD, 1929.
" <i>eriensis</i> × <i>O. rubri-</i>			
<i>calyx</i>	14 ³⁾	$\frac{2}{2}$	" "
		14	GATES, 1929.
" (<i>seg. decipiens</i> ×			
<i>grandiflora</i>) F ₁ . .	14 ⁴⁾	$\frac{2}{2}$	ILICK, 1929.
" (<i>seg. decipiens</i> ×			
<i>grandiflora</i>) F ₂ . .	14 ⁵⁾	$\frac{2}{2}$	" "
" <i>franciscana</i> × <i>O. fran-</i>			
<i>ciscana sulfurea</i> F ₁			
(one plant)	7	$\frac{2}{2}$	EMERSON, S. H., 1929.
" (<i>grandiflora</i> × <i>seg.</i>			
<i>decipiens</i>) F ₂ . . .	14 ⁶⁾	$\frac{2}{2}$	ILICK, 1929.
" (<i>grandiflora</i> × <i>seg.</i>			
<i>decipiens</i>) F ₂ . . .	14 ⁴⁾	$\frac{2}{2}$	" "
" <i>grandiflora</i> × <i>Hookeri</i>	14 ⁶⁾	$\frac{2}{2}$	CLELAND & OELKERS, 1929.
" <i>grandiflora</i> × <i>La-</i>			
<i>marckiana</i>	14 ⁷⁾	$\frac{2}{2}$	" " "
" <i>Hookeri</i> × <i>grandiflora</i>	14 ⁶⁾	$\frac{2}{2}$	" " "
" (<i>Hookeri</i> × <i>Lamar-</i>			
<i>ckiana</i>) <i>velutina</i> . .	14 ⁸⁾	$\frac{2}{2}$	HOEPPENER & RENNER, 1929.

¹⁾ Arranged as a circle of 8 + 3 pairs, or circle of 12 + 1 pair.

²⁾ Arranged as a ring of 12 + 1 pair as in the pollen parent.

³⁾ Arranged as a ring of 12 + 1 pair as in neither parent.

⁴⁾ Arranged as a circle of 6 + 4 pairs.

⁵⁾ Arranged as a circle of 6 + 4 pairs or as 7 pairs (the latter more common).

⁶⁾ Arranged as 2 circles of 4 + 3 pairs or circle of 14.

⁷⁾ Arranged as a circle of 4, circle of 6 + 2 pairs or circle of 14.

⁸⁾ Arranged as a ring of 4 + at least 3 pairs with the other 4 chromosomes arranged as 2 more pairs or a ring of 4.

OENOTHERACEAE (continued)	n	2n
<i>Oenothera</i> (continued)		
<i>Oenothera Lamarckiana cruciata</i>		
× <i>O. strigosa</i> . . .	14 ¹⁾	CLELAND & OELKERS, 1929.
	$\frac{2}{2}$	
" <i>Lamarckiana</i> × <i>grandiflora</i>	14 ²⁾	" " "
	$\frac{2}{2}$	
" <i>Lamarckiana</i> × <i>suaveolens sulfurea</i> . .	14 ³⁾	" " "
	$\frac{2}{2}$	
" (<i>Lamarckiana nanel-la</i> × <i>Hookeri</i>) <i>laeta</i>	14 ⁴⁾	HOEPPENER & RENNER, 1929.
	$\frac{2}{2}$	
" (<i>purpurea</i> × <i>cruciata</i>) <i>flexa</i> F ₂	14 ⁵⁾	RUDLOFF, 1929a.
	$\frac{2}{2}$	
" (<i>purpurea</i> × <i>Lamarckiana</i>) <i>laeta</i> F ₂	14 ⁴⁾	" "
	$\frac{2}{2}$	
" { (<i>purpurea</i> × <i>Lamarckiana</i>) <i>velutina</i> × <i>purpurea</i> } <i>velutina</i> .	14 ⁶⁾	" "
	$\frac{2}{2}$	
" (<i>purpurea</i> × <i>suaveolens</i>) <i>flava</i> F ₂ . . .	7	" "
" { (<i>purpurea</i> × <i>suaveolens</i>) <i>flava</i> × <i>R. biennis</i> } <i>purpurea-rubiflava</i>	14 ⁵⁾	" "
	$\frac{2}{2}$	
" <i>rubricalyx</i> × <i>O. erien-sis</i>	7 ⁷⁾ , 14	GATES, 1929.
" <i>rubricalyx</i> × <i>O. Novae-Scotiae</i>	14 ⁸⁾	SHEFFIELD, 1929.
	$\frac{2}{2}$	

¹⁾ Circle of 4, circle of 6 + 2 pairs, or circle of 14, or circle of 10 + 2 pairs.²⁾ See foot-note 7 page 205.³⁾ 2 circles of 4 + 3 pairs, or circle of 14, or circle of 12 + 1 pair or circle of 6 and circle of 8.⁴⁾ Arranged as a ring of 10 + 2 pairs.⁵⁾ Arranged as a ring of 4 + 5 pairs.⁶⁾ Arranged as a ring of 12 + 1 pair.⁷⁾ One plant was a haploid with 7 somatic chromosomes.⁸⁾ Arranged as a ring of 12 + 1 pair as in neither parent.

OENOTHERACEAE (continued)	n	2n	
<i>Oenothera</i> (continued)			
<i>Oenothera strigosa</i> × <i>Lamarckiana cruciata</i>	14 ¹⁾ $\frac{2}{2}$		CLELAND & OELKERS, 1929.
" <i>strigosa</i> × <i>suaveolens sulfurea</i>	14 ²⁾ $\frac{2}{2}$		" " "
" <i>suaveolens</i> × <i>Cockerelli</i>	14 ³⁾ $\frac{2}{2}$		" " "
" <i>suaveolens sulfurea</i> × <i>Lamarckiana</i>	14 ⁴⁾ $\frac{2}{2}$		" " "
" <i>suaveolens sulfurea</i> × <i>strigosa</i>	14 ⁵⁾ $\frac{2}{2}$		" " "
" <i>suaveolens</i> × <i>biennis rubiflava</i>	14 ⁵⁾ $\frac{2}{2}$		HOEPPENER & RENNER, 1929.
<i>Hartmannia tetraptera</i> (Cav.)			
SMALL = <i>Oenothera tetraptera</i> CAVANILLES	7	14	JOHANSEN, 1929a, c.
<i>Hartmannia tetraptera</i>	7		" 1929b.
<i>Anogra trichocalyx</i>	7		" "
" <i>trichocalyx</i> (NUTT.)			
SMALL.	7	14	" 1929c.
<i>Megapterium missouriense</i>	7		" 1929b.
" <i>missouriense</i> (SIMS) SPACH.	7		" 1929c.
<i>Taraxia heteranthera</i> var. <i>taraxacifolia</i>		ca. 14	" 1929b.
" <i>heteranthera</i> var. <i>taraxacifolia</i> (S. WATS) SMALL.		ca. 14	" 1299c.
" <i>ovata</i>	7		" 1929b.
" <i>ovata</i> (NUTT.) SMALL.	7	14	" 1929c.
<i>Chylisma clavaeformis</i>	7		" 1929b.
" <i>clavaeformis</i> var. <i>typica</i> (MUNZ) comb. nov.	7		" 1929c.

¹⁾ Circle of 4, circle of 6 + 2 pairs, or circle of 14, or circle of 10 + 2 pairs.

²⁾ Arranged as circle of 4 + 5 pairs, or circle of 12 + 1 pair.

³⁾ Arranged as circle of 8 + 3 pairs, or circle of 12 + 1 pair.

⁴⁾ 2 circles of 4 + 3 pairs, or circle of 14, or circle of 12 + 1 pair or circle of 6 and circle of 8.

⁵⁾ Arranged as a ring of 12 + 1 pair.

OENOTHERACEAE (continued)	n	2n	
<i>Galpinsia hartwegi</i>	7		JOHANSEN, 1929b.
<i>Gaura coccinea</i>	7		" "
" <i>coccinea</i> PURSH.	7	14	" 1929c.
" <i>lindheimeri</i>		14	" 1929b.
" <i>lindheimeri</i> ENGELM. & GRAY		14	" 1929c.
<i>Gauridium molle</i>	7		" 1929b.
<i>Stenosiphon linifolium</i>	7		" "
" <i>linifolium</i> (NUTT.) BRITTON	7		" 1929c.
<i>Fuchsia magellanica</i> var. <i>gracilis</i>	11		" 1929b.
" <i>magellanica</i> var. <i>riccartoni</i>	11		" "
" <i>magellanica</i> var. <i>riccartoni</i> HORT.	11	22	" 1929c.
<i>Sphaerostigma dentatum</i>	7		" 1929b.
" <i>dentatum</i> var. <i>campestre</i>	7		" "
" <i>dentata</i> var. <i>campestris</i> (JEPSON) comb. nov.	7	14	" 1929c.
" <i>spirale</i>	7		" 1929b.
" <i>spirale</i> (LEHM.) WALP.	7	14	" 1929c.
" <i>veitchianum</i>	7		" 1929b.
" <i>veitchianum</i> (HOOK) SMALL.		14	" 1929c.
<i>Skinnera procumbens</i>	11		" 1929b.
<i>Circaea alpina</i> L.		22	UDDLING, 1929.
" <i>intermedia</i> ERH.		22	" "
" <i>lutetiana</i> L.		22	" "
" <i>pacifica</i>	11		JOHANSEN, 1929b.
" <i>pacifica</i> ASCH. & MAG.		22	" 1929c.

UMBELLIFLORAE

UMBELLIFERAE

<i>Torilis Anthriscus</i> BERNH.	8	OGAWA, 1929.
<i>Petroselinum sativum</i> HOFFM.	11	" "
<i>Circuta virosa</i> L.	11	" "
<i>Foeniculum vulgare</i> GAERTN.	11	" "
<i>Ligusticum acutilobum</i> SIEB. et ZUCC.	11	" "

UMBELLIFERAE (continued)		n	2n	
<i>Angelica pubescens</i> MAXIM. . .	11			OGAWA, 1929.
„ <i>sylvestris</i> L.	11			„ „
„ sp.	33			„ „
<i>Phellopterus littoralis</i> FR. SCHM.	11			„ „
<i>Peucedanum decursivum</i> MAXIM.	11			„ „
„ <i>japonicum</i> THUNB.	11			„ „
<i>Pastinaca sativa</i> L.	11			„ „
CORNACEAE				
<i>Aucuba japonica</i> THUNB. . . .	26+44+2,	32		
	18+34+1 ₃ ,			
	+4+1 ₁ ,			
	18+34+6,			
	16+64+1.			MEURMAN, 1929a.
		32		SINOTO, 1929b.
ERICALES				
ERICACEAE				
<i>Rhododendron quinquefolium</i>				
Biss. et MOORE var. <i>speciosum</i> MAK.?	13			MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
PRIMULALES				
PRIMULACEAE				
<i>Primula acaulis</i>		22		HUSKINS, 1929.
„ <i>floribunda</i>		18		NEWTON & PELLEW, 1929.
„ <i>Juliae</i>		22		HUSKINS, 1929.
„ <i>Kewensis</i>	9	18		NEWTON & PELLEW, 1929.
	16+14 ¹⁾	36		„ „ „
„ <i>Kewensis</i> (tetraploid offspring)		34-37 ²⁾		„ „ „
„ <i>sinensis</i>	12 & 24			DE WINTON, 1929.
„ <i>verticillata</i>		18		NEWTON & PELLEW, 1929.
„ <i>acaulis</i> × <i>P. Juliae</i> .		22		HUSKINS, 1929.
„ <i>elatior</i> × <i>P. Juliae</i> .		22		„ „
„ <i>floribunda</i> × <i>P. Kewensis</i> (n = 9) . . .	9, 8+2 ₁			NEWTON & PELLEW, 1929.
„ <i>Kewensis</i> (n = 18) × <i>P. floribunda</i> . . .	10+6 ₁			„ „ „
„ <i>officinalis</i> × <i>P. Juliae</i>	11	22		HUSKINS, 1929.
„ — „Polyanthus Cloth of Gold” × <i>P. Juliae</i>		22		„ „

¹⁾ Occasionally 2 or 3 quadrivalents were found.²⁾ One dwarf plant had 20 chromosomes.

TUBIFLORAE	n	2n
CONVOLVULACEAE		
<i>Pharbitis hederacea</i>	15	KANÔ, 1929.
" <i>hispida</i>	15	" "
" <i>Nil.</i>	15	" "
<i>Quamoclit angulata</i>	15	" "
" <i>Sloteri</i>	30	" "
" <i>vulgaris</i>	15	" "
<i>Calystegia sepium</i> var. <i>japonica</i>	11	" "
" <i>Soldanella</i>	11	" "
<i>Calonyction bona-nox</i>		30 " "
<i>Ipomaea edible</i>	42?	" "
<i>Convolvulus tricolor</i>		20 " "
LABIATAE		
<i>Galeopsis bifida</i> BOENN.	16	MÜNTZING, 1929.
" <i>Tetrahit</i> L.	16	" "
" <i>Tetrahit</i> L. × <i>G. bifida</i> BOENN.	16	" "
<i>Salvia nipponica</i> MIQ. var. <i>argutidens</i> MAKINO	8	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929
<i>Mentha canadensis</i> L. var. <i>perascens</i> BRIQUET.	27	WOLF, 1929.
" <i>piperita</i> L. var. <i>crispa</i> L.	18	" "
" <i>piperita</i> (MITCHAM, HAAGE-SCHMIDT)		
" „aquatica 3 × viridis 1”	18	" "
" <i>piperita</i> (HUDS.) „aquatica 2 × viridis 1”	18	" "
" <i>piperita</i> L. „aquatica 1 × viridis 1”	18	" "
" <i>piperita</i> L. „aquatica 1 × viridis 2”	18	" "
" <i>piperita</i> L. (HEINE 1) „aquatica 1 × viridis 3”	18	" "
NOLANACEAE		
<i>Nolana atriplicifolia</i> Hort.	12	WHYTE, 1929a.
" <i>prostrata</i> L.	12	" "
" <i>prostrata</i> L. × <i>N. atriplicifolia</i> Hort. F ₁	24 ¹⁾	
	$\frac{2}{2}$	

¹⁾ Only a small amount of pairing was evident as 4 or 3 bivalents with 16 and 18 univalents respectively.

NOLANACEAE (continued)	n	2n	
<i>Nolana</i> (continued)			
<i>Nolana prostrata</i> × <i>N. atriplicifolia</i> Hort. F ₂ . . .	12 ¹⁾		WHYTE, 1929a.
" <i>prostrata</i> L. × <i>N. atriplicifolia</i> Hort. F ₃ & F ₄	12 ²⁾		" "
" <i>prostrata</i> L. × <i>N. atriplicifolia</i> Hort. (one F ₃ plant)	12 ³⁾	12	" "
	$\frac{2}{2}$		
" <i>prostrata</i> L. × <i>N. atriplicifolia</i> Hort. (special <i>Nolana</i> type) ⁴⁾	12		" "
SOLANACEAE			
<i>Lycium chinense</i>	12		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
" <i>halimifolium</i> MILL. . .	12		KOSTOFF & KENDALL, 1929.
<i>Solanum chacoense</i> BITTER . .	12		CLARK, 1929.
" <i>Commersonii</i> DUN. . .	12, 11-14 ⁵⁾		DE VILMORIN, 1929.
" <i>fendleri</i> GRAY . . .	24		CLARK, 1929.
" <i>lycopersicum</i> ⁶⁾ . . .	12 ₁ ⁷⁾	12 ⁸⁾	LINDSTROM, 1929.
" <i>lycopersicum</i> Dwarf aristocrat	12+2 ₁		LESLEY & LESLEY, 1929.
" <i>lycopersicum</i> Dwarf Champion	12+2 ₁		" " "
" <i>lycopersicum</i> Dwarf aristocrat (double trisomic × diploid)	12+1 ₂		" " "
" <i>lycopersicum</i> Dwarf aristocrat (triploid × diploid)	12+1 ₁ +1 ₂		" " "

¹⁾ Bivalents were regularly seen at diakinesis — lagging univalents being very few.

²⁾ Divisions were regular for the most part.

³⁾ A haploid flower was found on a shoot of a diploid plant which was lost.

⁴⁾ This plant especially resembled *N. atriplicifolia*.

⁵⁾ 4 to 8 monovalents or 2 to 3 trivalents might appear.

⁶⁾ This haploid arose in the F₂ generation from a varietal cross in which there was complete fertility. (Red Pear × Dwarf Peach).

⁷⁾ The first meiotic division was not an orderly procedure as 6 chromosomes might go to either pole or there might be random distribution.

⁸⁾ Occasional cells in the root-tips of the haploid possessed more than 12 chromosomes, 3 cells had 24 and 1 cell was found to have only 11.

SOLANACEAE (continued)		n	2n	
<i>Datura stramonium</i>		12		BLAKESLEE, 1929.
Primary mutants:				
<i>Poinsettia</i>		13		" "
<i>Rolled</i>		13		" "
Secondary mutants:				
<i>Dwarf</i>		13		" "
<i>Echinus</i>			25	" given by DAVENPORT, 1928.
<i>Mutilated</i>			25	BLAKESLEE given by DAVENPORT, 1928.
<i>Polycarpic</i>		13		BLAKESLEE, 1929.
<i>Sugarloaf</i>		13		" "
<i>Thistle</i>			25	" given by DAVENPORT, 1928.
Tertiary types:				
<i>Dwarf Sugarloaf</i>		13		BLAKESLEE, 1929.
<i>Wiry</i>		13		" "
<i>Nicotiana alata</i> Lk. et Otto			18	GOODSPEED & AVERY, 1929a.
" <i>alata</i> (from Uruguay)			18	AVERY, 1929.
" <i>alata</i> var. <i>grandiflora</i>	9		18	" "
" <i>alata</i> Lk. et Otto (controlled pollination)			18, 19 ¹⁾	" " GOODSPEED & AVERY, 1929a.
" <i>alata</i> (normal × monosomic)			18, 19 ²⁾	AVERY, 1929.
" <i>alata</i> (monosomic × normal)			18, 22, 25-27 ³⁾	GOODSPEED & AVERY, 1929.
			8-11, 9-10, 19 ³⁾	18, 22 ³⁾
			25 ⁴⁾ 26 ⁴⁾	
			27 ⁵⁾	AVERY, 1929.
" <i>digluta</i>		36		CLAUSEN & LAMMERTS, 1929.
" <i>glutinosa</i> ⁷⁾		12		" " "
				GOODSPEED, 1929b.

¹⁾ One monosomic *alata* form occurred in a population of 80 plants resulting from controlled pollination with normal pollen.

²⁾ Of 57 plants only 2 showed 19 chromosomes.

³⁾ In a trisomic plant a single large spindle showed 19 chromosomes.

⁴⁾ Of 22 plants 4 showed 22, 25, 26 and 27 chromosomes.

⁵⁾ Though the other plants with additional chromosomes showed no marked alteration in external morphology the plant with 22 chromosomes was a dwarf and the one with 25 chromosomes was abnormal with misshapen flowers.

⁶⁾ The plant with 27 chromosomes showed a full triploid set.

⁷⁾ This haplont was one of 24 plants that grew from seedlings which had been

SOLANACEAE (continued)	n	2n	
<i>Nicotiana</i> (continued)			
	$\frac{12_1^1}{2}$	12	GOODSPEED & AVERY, 1929b.
<i>Nicotiana Langsdorffii</i>	9		GOODSPEED 1929b, KOSTOFF, 1929.
„ <i>longiflora</i> CAV. . . .	10, 11	20	HOLLINGSHEAD, 1929.
„ <i>longiflora</i> var. <i>parviflora</i>		20	„ „
„ <i>longiflora</i> CAV. (open-pollinated probably <i>N. longiflora</i> × <i>N. alata</i>)		19	„ „
„ <i>nudicaulis</i>	24		GOODSPEED, 1929b.
„ <i>sylvestris</i>	12		„ „
„ <i>tabacum</i>	24		CLAUSEN & LAMMERTS, 1929.
„ <i>tabacum macrophylla</i>	70-72		KOSTOFF, 1929.
„ <i>tabacum</i> var. <i>purpurea</i>	24		GOODSPEED, 1929b.
„ <i>tabacum</i> var. <i>purpurea</i> (x-rayed)	$48_1, 19+2_1 + \frac{2}{2}$		
	fragment,		
	$\frac{12_3+12+12_1}{2}$,		„ „
	24, 23+1 ₁ ,		
	24+1 ₁ ,		„ 1929a.
	22+1 ₁ , 23,		
	24+		
	fragments,		
	23+		
	fragments,		
	23+2		
	fragments.		
„ <i>glauca</i> (carmine) ×			
<i>N. tabacum</i> white F ₁	$23+11_1, \frac{2}{2}$		CLAUSEN & LAMMERTS, 1929.
	$23+12_1, \frac{2}{2}$		
	$22+13_1, \frac{2}{2}$		

subjected to x-radiation. As no effects were apparent except in this case and that of another weak plant, this haplont was considered to have occurred spontaneously in a pure line.

¹) Random distribution of chromosomes occurred in the heterotypic metaphase

SOLANACEAE (continued)		n	2n	
<i>Nicotiana</i> (continued)				
		$24 + \frac{12_1}{2}$		
<i>Nicotiana</i>	<i>digluta</i> (carmine) ×			
	<i>N. tabacum</i> (one			
	plant) ¹⁾	$\frac{24_1}{2}$		CLAUSEN & LAMMERTS, 1929.
(„	<i>rustica pumila</i> × <i>N.</i>			
	<i>paniculata</i>) × <i>N.</i>			
	<i>paniculata</i>	$12 + \frac{1_1 - 9_1}{2}$		
		$\frac{12 + 24_1}{2}$	46, 80	LAMMERTS, 1929.
(„	<i>rustica pumila</i> × <i>N.</i>			
	<i>paniculata</i>) × <i>N.</i>			
	<i>paniculata</i> (one in-			
	dividual)	$13 + \frac{8_1}{2}$		„ „
(„	<i>paniculata</i> × <i>N. rus-</i>			
	<i>tica pumila</i>) × <i>N.</i>			
	<i>rustica</i>	$15 - 21$		
		$+ \frac{9_1 - 3_1}{2}$		
		$\frac{24 + 12_1}{2}$	56-58,	
			59, 60	„ „
(„	<i>paniculata</i> × <i>N. rus-</i>			
	<i>tica pumila</i>) × <i>N.</i>			
	<i>rustica</i> (one indivi-			
	dual)	$16 + \frac{9_1}{2}$		„ „
„	<i>tabacum</i> × <i>N. sylves-</i>			
	<i>tris</i> F ₁		36	RYBIN, 1929.
„	<i>tabacum</i> × <i>N. sylves-</i>			
	<i>tris</i> F ₂	$28 - 36$ ²⁾	72	„ „
„	<i>tabacum macrophylla</i>			
	× <i>N. Langsdorffii</i>			
	(androgenetic <i>Nico-</i>			
	<i>tiana</i> haploid) . . .	$\frac{9_1}{2}$		³⁾ KOSTOFF, 1929.

¹⁾ As the plant was identical with *N. tabacum purpurea* haploids except that it had white instead of carmine flowers it was concluded that this was a case of haploid merogony.

²⁾ Not infrequently fewer units than 35 were found and this was explained as the result of formation of polyvalent chromosomes.

³⁾ Out of 58 root-tip pieces only one was diploid, the rest all being haploid.

SOLANACEAE (continued)		n	2n	
<i>Petunia</i>	at least	14		MATSUDA, 1928.
PEDALIACEAE				
<i>Sesamum indicum</i> L.			26	MORINAGA, FUKUSHIMA, KANô, MARUYAMA, YAMASAKI, 1929.
ACANTHACEAE				
<i>Acanthus mollis</i> L.24 or > 24			GIGANTE, 1929.
PLANTAGINALES				
PLANTAGINACEAE				
<i>Plantago japonica</i> forma <i>poly-</i>				
<i>stachya</i>			36	SINOTO given by IKENO, 1929.
" <i>major</i> var. <i>asiatica</i> .			24	" " " " "
" <i>japonica</i> forma <i>poly-</i>				
<i>stachya</i> × <i>P. major</i>				
var. <i>asiatica</i>			36	" " " " "
RUBIALES				
DIPSACACEAE				
<i>Morina longifolia</i> WALL. . . .			34	KACHIDZE, 1929a.
" <i>persica</i> L.			34	" "
<i>Cephalaria alpina</i> SCHR. . . .			36	" "
" <i>ambrosioides</i> SCHR.			18	" "
" <i>caucasica</i> LITW. . . .			18	" "
" <i>elata</i> SCHR.			36	" "
" <i>graeca</i> B. et SCH. . . .			18	" "
" <i>laevigata</i> SCHR. . . .			36	" "
" <i>leucantha</i> SCHR. . . .			18	" "
" <i>media</i> LITW.			18	" "
" <i>rigida</i> R. et S.			18	" "
" <i>syriaca</i> SCHR.			10	" "
" <i>tatarica</i> (GMEL. . . .			36	" "
" <i>transsylvanica</i> L.				
var. <i>caucasica</i> . . .			18	" "
" <i>Tschichatchewii</i>				
Boiss.			36	" "
" <i>uralensis</i> SCHR. . . .			18	" "
<i>Di. sacus azureus</i> SCHRENK . .			18	" "
" <i>chinensis</i> BATAL. . . .			36	" "
" <i>ferox</i> LOIS.			18	" "
" <i>fullonum</i> MILL.			18	" "
" <i>inermis</i> WALL.			18	" "
" <i>laciniatus</i> L.			18	" "
" <i>pilosus</i> L.			18	" "
" <i>plumosus</i> KOCH. . . .			18	" "
" <i>sativus</i> HONCK			18	" "

DIPSACACEAE (continued)

n

2n

Dipsacus (continued)

<i>Dipsacus sylvestris</i> L.	18	KACHIDZE, 1929a.
" <i>torsus</i> ?	18	" "
<i>Succisa australis</i> WOLF.	20	" "
" <i>pratensis</i> MOENCH.	20	" "
<i>Knautia arvensis</i> COULT.	40	" "
" <i>hybrida</i> COULT.	20	" "
" <i>orientalis</i> L.	16	" "
" <i>purpurea</i> BOEB.	20	" "
<i>Pterocephalus plumosus</i> COULT.	18	" "
<i>Callistemma brachiatum</i> BOISS.	14	" "

SCABIOSA

Section *Sclerostemma*

<i>Scabiosa columbaria</i> L.	16	" "
" <i>fumarioides</i> Vis.	16	" "
" <i>holosericea</i> DC.	16	" "
" <i>gramuntia</i> L.	16	" "
" <i>ochroleuca</i> L.	16	" "
" <i>triniaeifolia</i> FRIV.	16	" "
" <i>vestina</i> KOCH.	16	" "

Section *Vidua*

<i>Scabiosa maritima</i> L.	16	" "
-------------------------------------	----	-----

Section *Asterocephalus*

<i>Scabiosa caucasica</i> MB. (from Caucasus)	36	" "
" <i>caucasica</i> MB. (from Uppsala)	54	" "
" <i>cretica</i> L.	18	" "
" <i>graminifolia</i> L.	18	" "
" <i>magnifica</i> ?	18	" "
" <i>micrantha</i> DESF.	18	" "
" <i>prolifera</i> L.	18	" "
" <i>pterocephala</i> L.	18	" "
" <i>songarica</i> SCHRENK.	18	" "
" <i>speciosa</i> ROYLE	18	" "
" <i>stellata</i> L.	36	" "
" <i>ucranica</i> L.	18	" "

CUCURBITALES

CUCURBITACEAE

<i>Luffa aegyptica</i> MILL.	13	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
<i>Bryonia dioica</i>	10	LINDSAY, 1929.
<i>Cucumis sativus</i>	7	14 HEIMLICH, 1929.

CUCURBITACEAE (continued)		n	2n	
<i>Trichosanthes japonica</i> REGEL.	11 ¹⁾	22		SINOTO, 1929b.
<i>Cucurbita maxima</i>		24		RAU, 1929a.
CAMPANULATAE				
CAMPANULACEAE				
<i>Campanula persicifolia</i>	8			DE SOUZA VIOLANTE, 1929.
COMPOSITAE				
<i>Helipterum corymbiflorum</i> . . .		16		HEITZ, 1929a.
<i>Dahlia coccinea</i>	16	32		LAWRENCE, 1929.
„ <i>coronata</i>		32		„ „
„ <i>Maxoni</i>		32		„ „
„ <i>Merckii</i>	18	36		„ „
„ <i>variabilis</i>	32	64		„ „
<i>Hidalgoa Wercklei</i>		ca. 31		„ „
<i>Bidens atrosanguinea</i>	24	48		„ „
<i>Gaillardia pulchella</i> Foug. . .	18			MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
<i>Centaurea Cyanus</i> L.	12			MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
<i>Crepis aculeata</i> (Dc.) Boiss . .	4			BABCOCK & CLAUSEN, 1929.
„ <i>alpina</i>		10		NAWASCHIN, 1928.
„ <i>alpina</i> L.	5			COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>artificialis</i>	12	24		COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>artificialis</i> (triploid) . . 18 ²⁾ , 19 ³⁾ , 20 ³⁾		36		COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>artificialis</i> (triploid pro- geny).		31, 33-35		COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>aspera</i> L.	4			BABCOCK & CLAUSEN, 1929.
„ <i>aurea</i> L. CASS.	5			COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>biennis</i> L.	20	39-41		COLLINS, HOLLINGSHEAD & AVERY, 1929.
		42-45		NAWASCHIN given by COLLINS, HOLLINGSHEAD & AVERY, 1929.

¹⁾ An unequal pair of chromosomes was distinguishable in meiotic divisions of male flowers.

²⁾ Where 18 units appeared the plate consisted of 17 + 1.

³⁾ Where 19 units appeared the plate consisted of 17 + 2, and where 20 as 16 + 4.

COMPOSITAE (continued)	n	2n
<i>Crepis</i> (continued)		
<i>Crepis blattarioides</i>		8, 12 ¹⁾ , 9, 14 ²⁾ GEITLER, 1929a.
„ <i>bursifolia</i> L.	4	BABCOCK & CLAUSEN, 1929.
„ <i>capillaris</i>		6 GEITLER, 1929a, b.
„ <i>virens</i>		6 NAWASCHIN, 1928.
„ <i>capillaris</i> (L.) WALLR. .		9 NAWASCHIN, 1929.
„ <i>capillaris</i> (L.) WALLR. (2n = 9) (open pollin- ation F ₁)		6, 7, 9 ³⁾ NAWASCHIN, 1929.
„ <i>capillaris</i> (L.) WALLR. (open pollination F ₂) .		6, 12, 21 ⁴⁾ „ „
„ <i>dioscoridis</i>		8 ⁵⁾ GEITLER, 1929a, NAWASCHIN, 1928, MEDWEDEWA, 1929.
„ <i>dioscoridis</i> L.		12 NAWASCHIN, 1929.
„ <i>dioscoridis</i> L. (2n = 9) (open pollination F ₁) .		6, 7, 9 „ „
„ <i>foetida</i> L.	5	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>grandiflora</i>		8 NAWASCHIN, 1928.
„ <i>leontodontoides</i> ALT. . .	5	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>Marschallii</i>		8 NAWASCHIN, 1928.
„ <i>multicaulis</i> LEDEB. . .	5	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>parviflora</i>		8 NAWASCHIN, 1928.
„ <i>pulcherrima</i>		8 „ „
„ <i>rhoeadiifolia</i>		10 „ „
„ <i>rubra</i> L.	5	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>rubra</i>		10 NAWASCHIN, 1928; GEITLER 1929a.
„ <i>setosa</i> HALL.	4	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>sibirica</i> L.	5	COLLINS, HOLLINGSHEAD & AVERY, 1929.

¹⁾ One triploid plant (2n = 12) appeared.

²⁾ Two plants appeared to have 9 as the diploid number. In a large epidermal cell 14 chromosomes were found.

³⁾ The F₁ plants were largely diploid, or triploid with a few trisomic plants.

⁴⁾ The F₂ plants included about the same proportion of diploid and triploid plants but also disomics and trisomics 3n + 1, 3n + 1 + 1 as well as a few tetraploids and 7n plants.

⁵⁾ MEDWEDEWA found the plant cells to have 2 large satellites, 2 small satellites or 1 large and 1 small satellite.

COMPOSITAE (continued)	n	2n
<i>Crepis</i> (continued)		
<i>Crepis taraxacifolia</i> THUILL.	4	BABCOCK & CLAUSEN, 1929.
„ <i>tectorum</i>	8	NAWASCHIN, 1928.
„ <i>tectorum</i> L.	4	BABCOCK & CLAUSEN, 1929.
„ <i>tectorum</i> L. (2n = 9) (open pollination F ₁)	6, 7, 9	NAWASCHIN 1929.
„ <i>tingitana</i> SALZ.	5	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>aspera</i> L. × <i>C. bursifolia</i> L.	4, 3+2 $\frac{1}{2}$, $\frac{2}{2}$ 2+4 $\frac{1}{2}$, 1+6 $\frac{1}{2}$, $\frac{2}{2}$ $\frac{2}{2}$ $\frac{8}{2}$	BABCOCK & CLAUSEN, 1929.
„ <i>aspera</i> L. × <i>C. aculeata</i>	4, 3+2 $\frac{1}{2}$, $\frac{2}{2}$ 2+4 $\frac{1}{2}$ $\frac{2}{2}$	„ „ „
„ <i>biennis</i> × <i>C. setosa</i> 26.47 P ₂ = <i>C. artificialis</i>	10-15	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>biennis</i> × <i>C. setosa</i>	10+4 $\frac{1}{2}$ $\frac{2}{2}$	COLLINS, HOLLINGSHEAD & AVERY, 1929.
(„ <i>biennis</i> × <i>C. setosa</i>)	15+4 $\frac{1}{2}$ $\frac{2}{2}$	COLLINS, HOLLINGSHEAD & AVERY, 1929.
„ <i>capillaris</i> (2n = 9) × <i>C. alpina</i>	10 ¹⁾	NAWASCHIN, 1929.
„ <i>capillaris</i> (2n = 9) × <i>C. neglecta</i>	16 ²⁾	„ „
„ <i>taraxacifolia</i> THUILL. × <i>C. tectorum</i> L.	4, 3+2 $\frac{1}{2}$, $\frac{2}{2}$ 2+4 $\frac{1}{2}$, $\frac{2}{2}$ 1+6 $\frac{1}{2}$, $\frac{2}{2}$	BABCOCK & CLAUSEN, 1929.
<i>Lactuca denticulata</i>	10	HEITZ, 1929a.

¹⁾ This number consisted of a diploid number of *C. capillaris* and a haploid of *C. alpina*.

²⁾ This hybrid had 4 haploid sets of *C. capillaris* and 1 set of *C. neglecta*.

MONOCOTYLEDONEAE

HELOBIAE

ALISMATACEAE	n	2n	
<i>Sagittaria Aginashi</i> MAKINO. . .	11		SHINKE, 1929.

HYDROCHARITACEAE

<i>Hydrocharis Morsus ranae</i> L. . .		28	TUSCHNJAKOWA, 1929b.
<i>Hydrilla verticillata</i> PRESL. . .	8 ¹⁾	16, 24	SINOTO, 1929b.

GLUMIFLORAE

GRAMINEAE

<i>Euchlena perenne</i>	20		LONGLEY given by EMERSON, R. A., 1929.
	104		RANDOLPH according to EMERSON, R. A., 1929.
„ <i>perenne</i> × <i>Zea Mays</i> varying nos. bi-, tri- and uni- valents.			LONGLEY & RANDOLPH given by EMERSON, R. A., 1929.
<i>Zea Mays</i>	10 ²⁾		LONGLEY given by EMERSON, R. A., 1929; BEADLE, 1929.
„ <i>Mays</i> (diploid)	$10, 9+2\frac{1}{2}$		McCLINTOCK, 1929a.
„ <i>Mays</i> (triploid)	$10_3,$ $9_3+1+1_1,$ $6_3+4+4\frac{1}{2}$	30	„ „
„ <i>Mays</i> (dip.) × <i>Z. Mays</i> (trip.)	$10_3,$ $9_3+1+1_1,$ 6_3+4+4_1		„ „
„ <i>Mays</i> (dip.) × <i>Z. Mays</i> (trip.)	$10, 10+1_1,$ $10+\frac{1_3}{2},$ $8+2_3,$ $9+1_3+1_1$		„
„ <i>Mays</i> (trip.) × <i>Z. Mays</i> (dip.)	$7+3_3,$ $6+4_3,$		

¹⁾ An unequal pair of chromosomes was distinguishable in meiotic divisions of male flowers of this form. Only somatic plates of the second form ($2n = 24$) were examined.

²⁾ According to BEADLE (1929) in sterile maize plants the two normal divisions of microsporogenesis were followed by further aberrant divisions until as many as 8 cells resulted, each with considerably less than the normal haploid number of chromosomes.

GRAMINEAE (continued)	n	2n	
<i>Zea</i> (continued)			
	5+5 ₃ ,		
	3+7 ₃ ,		
	8+2 ₃ +1,		
	8+1 ₃ +4		McCLINTOCK, 1929a.
<i>Zea Mays</i> F ₁ , Plant 94 ₂ , (2n+			
5)	5+5 ₃ ,		
	6+4 ₃ +1 ₁ ,		
	10+5 ₁ ,		
	9+7 ₁ ,		
	4+3 ₃ +8 ₁ ,		
	25 ₁ .		" "
" <i>Mays</i> (trip.) × <i>Z. Mays</i>			
(dip.) F ₁	9 + 1 ₁		McCLINTOCK, 1929b.
ANDROPOGONEAE.			
<i>Miscanthus sinensis</i> ANDERSS.			
var. <i>zebrinus</i> BEAL.	21		CHURCH, 1929b.
<i>Andropogon furcatus</i> MÜHL. .	35		" "
" <i>halepensis</i> BROTE-			
RO.	20		FAWOROW, 1929.
" <i>scoparius</i> MICHX.	21 + 14 ₁		CHURCH, 1929b.
	$\frac{2}{2}$		
" <i>sorghum</i>	20		RAU, 1929a.
" <i>sorghum</i> BROTERO	10	20	FAWOROW, 1929.
" <i>sorghum</i> var. <i>suda-</i>			
<i>nensis</i> PIPER	10	20	" "
" <i>sorghum</i> BROT. var.			
<i>vulgaris</i> HACK.		20	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
" <i>sorghum</i> BROTERO			
× <i>A. sorghum</i> var.			
<i>sudanensis</i> PIPER	10		FAWOROW, 1929.
<i>Sorghastrum nutans</i> (L.) NASH. .	20		CHURCH, 1929b.
<i>Saccharum barberi</i>	46		BREMER, 1929.
" <i>officinarum</i>	40	ca. 80	" "
" <i>officinarum</i>			
(<i>Loethers</i> cane)	49		" "
" <i>officinarum</i> (NAZ			
Reunion)	55		" "
" <i>sinense</i>	ca. 58		" "
" <i>spontaneum</i> (from			
Java)	56		" "
" <i>spontaneum</i> (= <i>Gla-</i>			
<i>gah Tabongo</i> from			
Celebes)	40		" "

GRAMINEAE (continued)	n	2n	
<i>Saccharum</i> (continued)			
<i>Saccharum spontaneum</i> (Gla- gah Tabongo) selfed	48-50		BREMER, 1929.
" <i>officinarum</i> (var. Black Cheribon) × <i>S. spontaneum</i> (from Java) ¹⁾ . .	68		" "
" „Kassoer” (<i>S. officinarum</i> × <i>S. spontaneum</i>) (from Java)	68		" "
<i>Saccharum officinarum</i> (var. Black Cheribon) × <i>S. spontaneum</i> F ₂ .	$\frac{136}{2}$		" "
" <i>officinarum</i> × <i>S.</i> <i>spontaneum</i> (Gla- gah Tabongo from Celebes)	$\frac{120}{2}$		" "
" „Toledo” from Phillipines (<i>S.</i> <i>officinarum</i> × <i>A. spontane-</i> <i>um</i>)	$\frac{120}{2}$		" "
<i>Saccharum officinarum</i> × <i>S.</i> <i>officinarum</i> (var. Black Che- ribon) × <i>S. spontaneum</i>	$\frac{148}{2}$		" "
POJ. 100.	$\frac{89}{2}$		" "
POJ. × <i>Kassoer</i> seedlings: POJ. 2364	$\frac{148}{2}$		" "
POJ. 2354	$\frac{157}{2}$		" "
POJ. 2323	$\frac{152}{2}$		" "
POJ. 2725	$\frac{106-7}{2}$		" "
POJ. 2883	$\frac{115}{2}$		" "
POJ. 2878	$\frac{119-20}{2}$		" "
EK 28	28		" "

¹⁾ As *Kassoer* cane showed the same mode of reduction divisions as this hybrid, BREMER considered that *Kassoer* was proved to be a spontaneous hybrid of this origin.

GRAMINEAE (continued)	n	2n	
PANICEAE ¹⁾			
<i>Digitaria sanguinalis</i> (L.) Scop.	14		CHURCH, 1929b.
<i>Paspalum muhlenbergii</i> NASH.	10 ²⁾		" "
PANICUM			
<i>Panicum frumentaceum</i> var.			
<i>crus-galli</i>		ca. 48	RAU, 1929a.
" <i>miliaceum</i>		42	" "
" <i>miliare</i>		36	" "
<i>Dichotomisflora</i>			
<i>Panicum dichotomisflorum</i>			
MICHX.	27		" "
<i>Capillaria</i>			
<i>Panicum miliaceum</i> L.	20 ³⁾		" "
<i>Dicanthelium</i>			
<i>Lanuginosa</i>			
<i>Panicum lindheimeri</i> NASH. var.			
<i>typicum</i> FERN	9		" "
" <i>lindheimeri</i> NASH.			
var. <i>fasciculatum</i>			
(TORR.) FERN.	9		" "
" <i>lindheimeri</i> var. <i>im-</i>			
<i>plicatum</i> (TORR.)			
FERN.			
" <i>lindheimeri</i> NASH. var.			
<i>septentrionale</i> FERN.	9		" "
" <i>subvillosum</i> ASHE. . .	9 ⁴⁾		" "
<i>Columbiana</i>			
<i>Panicum tsugetorum</i> NASH. . .	9		" "
<i>Sphaerocarpa</i>			
<i>Panicum sphaerocarpon</i> ELL. .	9 ⁵⁾		" "
<i>Oligosanthia</i>			
<i>Panicum scribnerianum</i> NASH.	9		" "
<i>Setaria italica</i> KUNTH		18	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
<i>Pennisetum typhoideum</i>		14	RAU, 1929a.
<i>Echinochloa crus-galli</i> (L.) BAUV.	21		CHURCH, 1929b.
" <i>frumentacea</i> (ROXB.)			
LINK. (= <i>Echi-</i>			
<i>nochloa crus-galli</i>			

¹⁾ Sequence of tribes and nomenclature used by CHURCH follow the treatment of HITCHCOCK (1920) but I have followed ENGLER and GILG.

²⁾ Counts of 9 and 11 were also made.

³⁾ Many counts of 18 were also made.

⁴⁾ Frequently 7, 8 and 10 were counted.

⁵⁾ Irregular distribution of the 9 bivalents often occurred.

GRAMINEAE (continued)	n	2n	
<i>Echinochloa</i> (continued)			
(L.) BAUV. var.			
<i>edulis</i> HITCHC.) .	28		CHURCH, 1929b.
<i>Oryza sativa</i> „Jirasala”		24	RAU, 1929b.
„ <i>sativa</i> „Tavalakanan” .		24	„ „
PHALARIDEAE			
<i>Phalaris canariensis</i> L.	6 ¹⁾		CHURCH, 1929a.
„ <i>arundinacea</i> L. . . .	7		„ „
„ <i>arundinacea</i> L. var.			
<i>picta</i> L.	14 ¹⁾		„ „
AGROSTIDEAE			
<i>Alopecurus geniculatus</i> L. var.			
<i>aristulatus</i> TORR. .	7 ¹⁾		„ „
„ <i>pratensis</i> L. . . .	14 ¹⁾		„ „
<i>Ammophila breviligulata</i> FERN.	14 ¹⁾		„ „
<i>Holcus lanatus</i> L.		14	STÄHLIN, 1929.
„ <i>mollis</i> L.		14	„ „
AVENEAE			
<i>Avena sativa</i> L.	21 ¹⁾		„ „
<i>Phragmites communis</i>	21		TISCHLER, 1929a, b.
„ <i>communis</i> var.			
<i>Pseudodonax</i> . . .	21		„ „
<i>Dactylis glomerata</i> L.	14 or 28 ₁ ¹⁾		CHURCH, 1929a.
	<u>2</u>		
<i>Cynosurus cristatus</i> L.		14	STÄHLIN, 1929.
„ <i>echinatus</i> L. . . .		14	„ „
Poa			
Subgenus Eu-Poa HACKEL			
Section Leptoneuræ DÖLL.			
Subsection Ochlopoa A.			
& G.			
<i>Poa annua</i> L.		28	„ „
Subsection Bolbophorum			
A. & G.			
<i>Poa alpina</i> L. = <i>P. bulbosa</i> L.			
ssp. <i>alpina</i> ASCHERS var. <i>ba-</i>			
<i>densis</i> (HKE.) KOCH		42	„ „
<i>Poa alpina</i> L. = <i>P. bulbosa</i> L.			
ssp. <i>alpina</i> ASCHERS var. <i>ty-</i>			
<i>pica</i> BECK.		42	„ „
Subsection Oreinos A. & G.			
<i>Cenisia</i> A. & G.			
<i>Poa caesia</i> SM.		42	„ „

¹⁾ Cytological abnormalities of various kinds lagging chromosomes, incomplete pairing etc. were found.

GRAMINEAE (continued)	n	2n	
Poa (continued)			
Subsection <i>Hylopoa</i> A. & G.			
<i>Poa nemoralis</i> L.	42	STÄHLIN, 1929.	
„ <i>palustris</i> L.	42	„	„
„ <i>sterilis</i> M. B. subsp. <i>versicolor</i> (BESS.) RICHTER. .	28	„	„
Subsection <i>Trichopoa</i> A. & G.			
<i>Poa compressa</i> L.	56	„	„
Section <i>Pachyneurae</i> ASCHERS			
Subsection <i>Homalpoa</i> DUMORT.			
<i>Poa Chaixi</i> VILL. = <i>P. sudetica</i> HKE.	14+2	„	„
Subsection <i>Pandemos</i> A. & G.			
<i>Poa pratensis</i> L.	56	„	„
„ <i>trivialis</i> L.	14	„	„
Subgenus <i>Pseudofestuca</i> A. & G.			
<i>Poa violacea</i> BELL.	28	„	„
GLYCERIA			
Section <i>Euglyceria</i> GRISEB.			
<i>Glyceria fluitans</i> R. BR. . . .	28	„	„
„ <i>plicata</i> FRIES.	28	„	„
Section <i>Hydropoa</i> DUM.			
<i>Glyceria aquatica</i> WAHLB. var. <i>arundinacea</i> ASCHERS.	28	„	„
„ <i>aquatica</i> WAHLB. var. <i>typica</i> ASCHERS. . .	56	„	„
„ <i>nervata</i> TRIN.	28	„	„
<i>Catabrosa aquatica</i> P. B. . . .	21?	„	„
<i>Atropis distans</i> GRISEB. = <i>Glyceria distans</i> WAHLB. = <i>Festuca distans</i> KUNTH	28	„	„
FESTUCEAE			
<i>Festuca duriuscula</i> L.	21 ¹⁾	CHURCH, 1929a.	
„ <i>ovina</i> L.	28 ¹⁾	„	„
„ <i>rubra</i> L.	21 ¹⁾	„	„

¹⁾ See foot-note page 224.

GRAMINEAE (continued)	n	2n
FESTUCA		
Section ovinae HACK.		
Subsection Intravaginales HACK.		
<i>Festuca ovina</i> L. subsp. <i>alpina</i> (SUTER) HACK. var. <i>Suteri</i> St. Y.	14	STÄHLIN, 1929.
" <i>ovina</i> L. subsp. <i>eu-ovina</i> HACK. var. <i>capillata</i> HACK.	14	" "
" <i>ovina</i> L. subsp. <i>eu-ovina</i> HACK. var. <i>duriuscula</i> HACK	28	" "
" <i>ovina</i> L. subsp. <i>eu-ovina</i> HACK. var. <i>glauca</i> HACK. (<i>pallens</i> ?)	28	" "
" <i>ovina</i> L. subsp. <i>eu-ovina</i> HACK. var. <i>glauca</i> HACK. subv. <i>pallens</i> (HOST.) HACK.	28	" "
" <i>ovina</i> L. subsp. <i>eu-ovina</i> HACK. var. <i>supina</i> HACK. subv. <i>grandiflora</i> HACK.	14	" "
" <i>ovina</i> L. subsp. <i>eu-ovina</i> HACK. var. <i>vulgaris</i> HACK. subv. <i>genuina</i> HACK	42	" "
" <i>ovina</i> L. subsp. <i>frigida</i> HACK. var. <i>glacialis</i> (MIEGEVILLE) HACK.	14	" "
" <i>ovina</i> L. subsp. <i>frigida</i> HACK. var. <i>rupicaprina</i> (KERN) HACK.	28	" "
" <i>ovina</i> L. subsp. <i>laevis</i> HACK. var. <i>Halleri</i> (ALL.) HACK.	14	" "
" <i>ovina</i> L. subsp. <i>sulcata</i> HACK. var. <i>Panciciana</i> HACK	28	" "
" <i>ovina</i> L. subsp. <i>sulcata</i> HACK. var. <i>valesiaca</i> KOCH. subv. <i>eu-valesiaca</i> St. Y.	14	" "

GRAMINEAE (continued)	n	2n	
FESTUCA (continued)			
Subsection ovinae EXARATAE ST. Y.			
<i>Festuca amethystina</i> L.	28		STÄHLIN, 1929.
Subsection Extravaginales vel mixtae HACK.			
<i>Festuca rubra</i> L. subsp. <i>eu-rubra</i> HACK. var. <i>fallax</i> HACK.	42	"	"
" <i>rubra</i> L. subsp. <i>eu-rubra</i> HACK. var. <i>genuina</i> HACK. subv. <i>arenaria</i> (FRIES) HACK.	42	"	"
" <i>rubra</i> L. subsp. <i>eu-rubra</i> HACK. var. <i>genuina</i> HACK. subv. <i>vulgaris</i> HACK. . . .	42	"	"
" <i>rubra</i> L. subsp. <i>eu-rubra</i> HACK. var. <i>multiflora</i> subv. <i>planifolia</i> (TRAUTV.) HACK.	42	"	"
" <i>rubra</i> L. subsp. <i>heterophylla</i> (LAM.) HACK.	42	"	"
" <i>rubra</i> L. subsp. <i>violacea</i> (GAUD.) HACK.	14	"	"
Section Bovinae FRIES.			
<i>Festuca elatior</i> L. subsp. <i>arundinacea</i> HACK. var. <i>eu-arundinacea</i> ST. Y.	42	"	"
" <i>elatior</i> L. subsp. <i>arundinacea</i> HACK. var. <i>Uechtritziana</i> (WIESBAUR) HACK.	28	"	"
" <i>elatior</i> L. subsp. <i>pratensis</i> HACK. var. <i>apennina</i> HACK.	42	"	"
" <i>elatior</i> L. subsp. <i>pratensis</i> HACK. var. <i>eu-pratensis</i> ST. Y.	14	"	"
" <i>gigantea</i> VILL.	42	"	"
Section Subbulbosae NYM.			
<i>Festuca Mairei</i> ST. Y.	28	"	"
" <i>spadicea</i> L.	14	"	"

GRAMINEAE (continued)	n	2n	
FESTUCA (continued)			
Section <i>Variae</i> HACK.			
Subsection <i>Intravaginales</i> HACK.			
<i>Festuca varia</i> HKE. subsp. <i>eu- varia</i> HACK. var. <i>fla- vescens</i> (BELL) A. & G.	14		STÄHLIN, 1929.
<i>Festuca varia</i> HKE. subsp. <i>eu- varia</i> HACK. var. <i>ge- nuina</i> HACK.	28	"	"
" <i>varia</i> HKE. subsp. <i>es- kia</i> (RAM.) ST. Y. . .	42	"	"
" <i>varia</i> HKE. subsp. <i>sco- paria</i> KERN et HACK. var. <i>eu-scoparia</i> HACK. subv. <i>genuina</i> HACK. f. <i>crinum ursi</i> RAM. .	14	"	"
Subsection <i>Extravaginales</i> HACK.			
<i>Festuca pulchella</i> HJTER, POR- TA et RIGO	14	"	"
" <i>spectabilis</i> JAN. . . .	42	"	"
Section <i>Montanae</i> HACK.			
<i>Festuca silvatica</i> VILL.	42	"	"
<i>Scleropoa rigida</i> (L.) KUNTH. .	14	"	"
<i>Vulpia bromoides</i> DUM. (relat- ed to <i>V. myurus</i>)	14	"	"
" <i>myurus</i> (L.) DUM. . .	42	"	"
<i>Desmateria sicula</i> DUM. . . .	14	"	"
BROMUS			
Subgenus <i>Bromus</i> A. & G.			
Section <i>Zerna</i> PANZER.			
Subsection <i>Festucaria</i> GODR.			
<i>Bromus cappadocicus</i> BOISS. et BAL. (belonging to <i>erectus</i> group) . . .	42	"	"
" <i>ciliatus</i> L.	14	"	"
" <i>ciliatus</i> L. var. <i>pur- gans</i> GR.	14	"	"
" <i>erectus</i> HUDS. subsp. <i>eu-erectus</i> A. & G. . .	42	"	"
" <i>erectus</i> HUDS. subsp. <i>stenophyllus</i> LK. . .	42	"	"
" <i>inermis</i> LEYSS. . . .	42	"	"

GRAMINEAE (continued)	n	2n	
BROMUS (continued)			
<i>Bromus pacificus</i> SHEAR. . .	42		STÄHLIN, 1929.
„ <i>pumpellianus</i> SCRIBN. (closely related to <i>inermis</i>)	42	„	„
„ <i>ramosus</i> HUDS. var. <i>eu-ramosus</i> A. & G. . .	14	„	„
Subsection <i>Eubromus</i> GODR.			
<i>Bromus madritensis</i> L.	42	„	„
„ <i>maximus</i> DESF. = <i>villosus</i> FORSK.	56	„	„
„ <i>maximus</i> DESF. var. <i>Gussoni</i> PARL.	28	„	„
„ <i>purpurascens</i> DEL. = <i>rubens</i> L.	28	„	„
„ <i>sterilis</i> L.	14	„	„
„ <i>tectorum</i> L. var. <i>longipilus</i> KUMM. et SENDTN.	14	„	„
„ <i>tectorum</i> L. var. <i>typicus</i> A. & G.	14	„	„
Section <i>Zeobromus</i> GRISEB.			
Subsection <i>Michelaria</i> DUM.			
<i>Bromus arduennensis</i> DUM. . .	14	„	„
Subsection <i>Serrafalcus</i> KOCH. = <i>Bromi secalini</i> BERT.			
<i>Bromus arvensis</i> L.	14	„	„
„ <i>Kalmii</i> A. GR.	14	„	„
„ <i>macrostachys</i> DESF. . .	14	„	„
„ <i>mollis</i> L. = <i>hordeacus</i> L.	28	„	„
„ <i>secalinus</i> L.	28	„	„
„ <i>squarrosus</i> L.	14	„	„
„ <i>variegatus</i> BIEB. (like <i>mollis</i>)	42	„	„
„ <i>variegatus</i> BIEB. subsp. <i>japonicus</i> THUNB. = <i>patulus</i> M. & K. . .	14	„	„
Subgenus <i>Ceratochloa</i> P. B.			
<i>Bromus australis</i> SPRENG. . .	28	„	„
„ <i>breviaristatus</i> BUCKL. .	56	„	„
„ <i>carinatus</i> HOOK. et ARN.	56	„	„

GRAMINEAE (continued)	n	2n	
BROMUS (continued)			
<i>Bromus polyanthus</i> SCRIBN. . .		42	STÄHLIN, 1929.
„ <i>sitchensis</i> BONG. . . .		42	„ „
„ <i>unioloides</i> HUMB. et KUNTH. = <i>Ceratochl-</i> <i>oa Schraderi</i> KUNTH.		28	„ „
„ <i>virens</i> BUCKL. = <i>cari-</i> <i>natus hookerianus</i> (THUNB.) SHEAR . .		14	„ „
<i>Boissiera bromoides</i> HOCHST. .		28	„ „
CHLORIDEAE			
<i>Spartina alterniflora</i> LOISEL var. <i>glabra</i> (MUHL.) FERN. . . .	$14 + 14 \frac{1}{2}$ ¹⁾		CHURCH, 1929a.
<i>Spartina michauxiana</i> HITCH. .	14 ²⁾		„ „
<i>Eleusine coracana</i>		ca. 36	RAU, 1929a.
<i>Agropyron cristatum</i>	14		PETO, 1929.
„ <i>fenerum</i>	14 ²⁾		„ „
„ <i>Griffithsii</i>	7		„ „
„ <i>pungens</i>	21 ²⁾		„ „
„ <i>repens</i>	21 ²⁾		„ „
„ <i>repens</i> L.	21		MOWERY, 1929.
„ <i>Richardsonii</i>	14		PETO, 1929.
<i>Secale cereale</i> (Prolific)	7		MELBURN, 1929.
<i>Triticum acuminatum</i> KAJ. . . .		28	KAJANUS, 1927.
„ <i>compactum</i> HOST. Ko- maba # 1		42	KAGAWA, 1929c.
„ <i>dicoccoides</i> var. <i>Kot-</i> <i>schyanum</i> PERC. . . .	14		KIHARA, 1929b.
„ <i>dicoccum</i>		28	KAGAWA, 1929d.
„ <i>dicoccum</i> SCHÜBL. (Blé Amidonnier blanc)		28	„ 1929a.
„ <i>dicoccum</i> SCHÜBL. U. A. C. (Utsunomi- ya Agr. Coll.) # 1. . .		28	„ 1929b.
„ <i>dicoccum</i> var. <i>liquifor-</i> <i>me</i> KÖRN.	14		KIHARA, 1929b.
„ <i>durum</i> DESF. Koma- ba # 1		28	KAGAWA, 1929c.

¹⁾ See foot-note page 224.²⁾ Lagging of one or two chromosome pairs was observed in the anaphase of the heterotypic division in this species.

GRAMINEAE (continued)	n	2n
TRITICUM (continued)		
<i>Triticum durum</i> var. <i>Reichenbachii</i> KÖRN.	14	KIHARA, 1929b.
" <i>monococcum</i>		14 KAGAWA, 1929d.
" <i>monococcum</i> L.		14 KAJANUS, 1929.
" <i>monococcum</i> L. (U.A. C. Utsunomiya Agr. Coll.) #1		14 KAGAWA, 1929a.
" <i>obtusatum</i> KAJ.		42 KAJANUS, 1929.
" <i>polonicum</i>		28 KAGAWA, 1929d.
" <i>polonicum</i> L. (Blé de Pologne ou d'Astrakan)		28 " 1929a, b.
" <i>polonicum</i> var. <i>vestitum</i> KÖRN.	14	KIHARA, 1929b.
" <i>spelta</i> L. (<i>ordinaire blanc sans barbes</i>)		42 " 1929c.
" <i>spelta</i> var. <i>Duhamelianum</i> KÖRN.	21	" 1929b.
" <i>turgidum</i> var. <i>buccale</i> KÖRN	14	JENKINS, 1929.
" <i>vulgare</i>		42 KAGAWA, 1929d.
" <i>vulgare</i> Hort. (Akadamura)		42 " 1929a.
" <i>vulgare</i> var. <i>erythrospermum</i> KÖRN.	21	KIHARA, 1929b.
" <i>durum</i> × <i>Triticum vulgare</i> F ₁	14 + 7 ₁	SAPÉHIN, L. A., 1929.
" <i>durum</i> × <i>Triticum vulgare</i> F ₂	14—21 + 7 ₁ — 0 ₁	" " "
" <i>durum</i> × <i>Triticum vulgare</i> F ₂ (#183)	14 + 7 ₁	" " "
" <i>durum</i> × <i>Triticum vulgare</i> F ₂ (#135)	16 + 4 ₁	" " "
" <i>durum</i> × <i>Triticum vulgare</i> F ₃ (progeny of #135)	16 + 4 ₁ — 2 ₁ , 18 + 2 ₁	" " "
" <i>durum</i> × <i>Triticum vulgare</i> F ₃ (progeny of #183)	14 + 0 ₁ — 6 ₁ , 15 + 4 ₁ , 16 + 5 ₁ , 17 + 4 ₁	" " "

GRAMINEAE (continued)	n	2n	
TRITICUM (continued)			
<i>Triticum vulgare</i> var. <i>ferrugineum</i> pure line # 100 × <i>Secale cereale</i> (winter rye)			
Hybrid # 6	49		PLOTNIKOV, 1928.
„ # 173	46	„	„
„ # 208	44	„	„
„ # 323	42	„	„
AEGILOPS ¹⁾			
Subgenus <i>Amblopyrum</i>			
JAUB. et Sp.			
Section <i>Anathera</i> EIG.			
<i>Aegilops mutica</i> BOISS. ²⁾ . . .	14		SCHIEMANN, 1929.
Subgenus <i>Eu-Aegilops</i>			
Section <i>Platystachys</i> EIG.			
Subsection <i>E marginata</i>			
<i>Aegilops bicornis</i> (FORSK.) JAUB.			
et Sp.	14	„	„
„ <i>longissima</i> SCHW. et			
NUSCH	14	„	„
„ <i>sharonensis</i> EIG. . .	14	„	„
Subsection <i>Truncata</i>			
<i>Aegilops ligustica</i> COSS. ³⁾ . .	14	„	„
„ <i>speltoides</i> TAUSCH. . .	14	„	„
	7		JENKINS, 1929.
„ <i>speltoides</i> TAUSCH.			
var. <i>ligustica</i>			
BOISS.	28		KAGAWA, 1929a.
Section <i>Pachystachys</i> EIG.			
<i>Aegilops squarrosa</i> L. . . .	14	„	„
„ <i>crassa</i> BOISS. ³⁾ . . .	28&42		SCHIEMANN, 1929.
	21		
„ <i>juvenale</i> (THEL-			
LUNG) EIG. (= <i>A.</i>			
<i>turcomanica</i> ROS-			
HEV.)	21		POPOVA, 1929a; SOROKINA given by POPOVA, 1929b.
„ <i>ventricosa</i> TAUSCH. ³⁾ .	28		SCHIEMANN, 1929.

¹⁾ Sections are according to EIG. (1929).

²⁾ Two varieties were examined.

³⁾ As no figures are shown, and as all determinations of chromosome numbers by SCHIEMANN 1928 were made from somatic tissues, the diploid numbers have been included here.

GRAMINEAE (continued)	n	2n	
Section <i>Monoleptathera</i> ERG.			
<i>Aegilops cylindrica</i> Host. ¹⁾		28	KAGAWA, 1929a, b; SCHIEMANN, 1929.
	14		POPOVA, 1929a.
Section <i>Macrathera</i> ERG.			
<i>Aegilops caudata</i> L. ¹⁾		14	SCHIEMANN, 1929.
„ <i>comosa</i> Sibth. & Sm. ¹⁾		14	„ „
„ <i>uniaristata</i> Vis. ¹⁾		14	„ „
Section <i>Pleionathera</i> ERG.			
Subsection <i>adherens</i>			
<i>Aegilops Kotschyi</i> Boiss. . .		28	„ „
„ <i>variabilis</i> var. <i>typica</i> ERG.		28	„ „
„ <i>variabilis</i> var. <i>mutica</i> ERG.		28	„ „
Subsection <i>Libera</i>			
<i>Aegilops biuncialis</i> Vis. . . .		28	POPOVA, 1929a.
„ <i>columnaris</i> Zhuk. ²⁾		28	„ „
„ <i>ovata</i> L.		28	SCHIEMANN, 1929; KAGAWA, 1929b, c.
	14		KIHARA, 1929b.
„ <i>triaristata</i> Willd. . .		28, 42	SCHIEMANN, 1929.
„ <i>triuncialis</i> L. ³⁾ . . .		28	„ „
	14		POPOVA, 1929a; KIHARA, 1929b.
„ <i>umbellulata</i> Zhuk. ⁴⁾		14	SCHIEMANN, 1929.
„ <i>ventricosa</i> Tausch. ⁵⁾		14	KIHARA, 1929b.
„ <i>ovata</i> × <i>Aegilops ventricosa</i> 5 — 10 + univ.		28	„ „
„ <i>ovata</i> × <i>Aegilops triuncialis</i> 5 — 11 + univ.			„ „
„ <i>triuncialis</i> × <i>Aegilops ovata</i>		28	„ „
„ <i>ventricosa</i> × <i>Aegilops ovata</i> 3 — 8 + univ.		28	„ „

¹⁾ See foot-note 3 page 233.

²⁾ The „Bastardtyp” (*triuncialis* × *triaristata*) referred to by SCHIEMANN (1928) was determined to be a *columnaris* Zhuk.

³⁾ *Aegilops triticoideus* of KIHARA, 1924 was identified as *A. triuncialis* L.

⁴⁾ *Aegilops ovata* var. *anatolica* referred to by SCHIEMANN (1928) was determined to be *A. umbellulata* Zhuk.

⁵⁾ *Aegilops squarrosa* (2n = 28) could not be distinguished from *A. ventricosa* Tausch

GRAMINEAE (continued)		n	2n	
AEGILOPS (continued)				
<i>Aegilops ovata</i> × <i>Triticum dicoccoides</i>	0 — 3 +			
	univ.	28	KIHARA, 1929b.	
" <i>ovata</i> × <i>Triticum durum</i>	1 — 7 +			
	univ.	28	" "	
" <i>triuncialis</i> × <i>Triticum dicoccoides</i> ¹⁾	0 — 7 +			
	univ.	28	" "	
" <i>triuncialis</i> × <i>Triticum dicoccum</i>	1 — 7 +			
	univ.	28	" "	
" <i>triuncialis</i> × <i>Triticum durum</i>	0 — 8 +			
	univ.	28	" "	
" <i>triuncialis</i> × <i>Triticum polonicum</i> ¹⁾	3 — 8 +			
	univ.	28	" "	
" <i>triuncialis</i> × <i>Triticum spelta</i>	0 — 7 +			
	univ.	35	" "	
" <i>triuncialis</i> × <i>Triticum vulgare</i>	0 — 5 +			
	univ.	35	" "	
" <i>cylindrica</i> × <i>Triticum dicoccum</i>	$\frac{28_1}{2}$		KAGAWA, 1929b.	
" <i>ovata</i> × <i>Triticum polonicum</i>	$\frac{28_1}{2}$		" "	
<i>Hordeum</i> ²⁾ <i>bulbosum</i>		28	GHIMPU, 1929f.	
" <i>cornutum</i> Hort. VIL-				
" MORIN		14	" 1929a, f.	
" <i>distichon</i> L.		14	KAGAWA, 1929c.	
" <i>distichum giganteum</i>				
" Hort. VILMORIN.		14	GHIMPU, 1929a, f.	
" <i>distichum erectum</i>				
" var. <i>Princesse de Svalöf</i>		14	" 1929c.	

¹⁾ See foot-note 4 page 234.²⁾ According to GHIMPU (1929a, c, f) all species of *Hordeum* examined showed a pair of satellites except *H. maritimum*.

GRAMINEAE (continued)	n	2n	
HORDEUM (continued)			
<i>Hordeum distichum nutans</i> var.			
<i>Princesse de Svalöf</i>	14		GHIMPU, 1929a, f.
" <i>distichum nutans</i>			
var. <i>Issoudun</i> . . .	14		" 1929a, f.
" <i>distichum nutans</i>			
<i>spontanaceum</i> Hort.			
VILMORIN	14		" 1929a, f.
" <i>erectum</i> var. <i>Gold-</i>			
<i>thorpe</i>	14		" 1929a, f.
" <i>hexastichum</i>	14		" "
" <i>hexastichum trifur-</i>			
<i>catum album mon-</i>			
<i>struosum</i> Hort. VIL-			
MORIN	14		" "
" <i>jubatum</i> L.	28		KAGAWA, 1929c.
" <i>maritimum</i> ¹⁾	14		GHIMPU, 1929a, f.
" <i>nigrum</i>	14		" "
" <i>nudiramulosum</i> Hort.			
VILMORIN	14		" "
" <i>nudum</i>	14		" "
" <i>secalinum</i>	28		" 1929f.
" <i>tetrastichum</i>	14		" 1929a, f.
" <i>thyrsoides</i> Hort.			
VILMORIN	14		" "
" <i>vulgare</i> Branching			
Hort. VILMORIN. . .	14		" "
" <i>vulgare Escourgeon</i>			
<i>d'Algérie</i>	14		" "
" <i>zeocritum</i>	14		" "
HORDEUM			
Subgenus <i>Elymocrithe</i> A.			
& G.			
Section <i>Euhordeum</i> A. & G.			
Subsection <i>Crithe</i> DÖLL.			
<i>Hordeum distichum</i> L. var. <i>nu-</i>			
<i>tans</i> SCHÜBL.	14		STÄHLIN, 1929.
" <i>distichum</i> L. var. <i>tri-</i>			
<i>furcatum</i> WENDE-			
ROTH	14+1		" "
Subsection <i>Hordeastrum</i>			
DÖLL.			
<i>Hordeum bulbosum</i> L.	28		" "

¹⁾ This species did not show a pair of satellites, GHIMPU (1929a, f).

GRAMINEAE (continued)	n	2n	
HORDEUM (continued)			
<i>Hordeum jubatum</i> L.	28		STÄHLIN, 1929.
„ <i>murinum</i> L.	28		„ „
„ <i>secalinum</i> SCHREB.	28		„ „
Section <i>Cuviera</i> KOELER.			
<i>Hordeum caput medusae</i> COSS.	14		„ „
„ <i>silvaticum</i> HUDS.	28		„ „
Subgenus <i>Euelymus</i> A. & G. = <i>Elymus</i> L.			
Section <i>Elymus</i> HOCHST.			
<i>Hordeum arenarium</i> ASCHERS.	56		„ „
Section <i>Clinelymus</i> GRISEB.			
<i>Hordeum canadense</i> A. & G.	28		„ „
„ <i>nigrescens</i> × <i>H. trifurcatum</i> Hort. VIL-			
„ <i>nigrum</i> × <i>H. trifurcatum</i> Hort. VIL-	14		GHIMPU, 1929a, f.
„ <i>Steudelii</i> × <i>H. trifurcatum</i>	14		„ „
„ <i>Steuclii</i> × <i>H. trifurcatum</i>	14		„ „
CYPERACEAE			
<i>Dulichium arundinaceum</i> (L.) BRITTON	16		HICKS, 1929.
<i>Cyperus dentatus</i> TORR.	17		„ „
„ sp. (<i>C. tenellus</i> L?)	21		„ „
„ <i>erythrorhizos</i> MUHL.	48		„ „
„ <i>esculentus</i> L.	54		„ „
„ <i>filiculmis</i> VAHL. var. <i>macilentus</i> FERN.	73		„ „
<i>Eriophorum virginicum</i> L.	29		„ „
<i>Scirpus palustris</i> (from Lund).	8		HÅKANSSON, 1929d.
„ „ (from Holmsjö)	19	ca. 38	„ „
<i>Eleocharis acicularis</i> (L.) R.&S. 18,19,28 ¹⁾	25-29		HICKS, 1929.
„ <i>capitata</i> (L.) R. BR. (= <i>E. tenuis</i> (WILLD.) SCHULTZ.	19		„ „
„ <i>obtusata</i> (WILLD.) SCHULTES	5		

¹⁾ Late prophase showed 28 chromosomes in the majority of cases. In heterotypic metaphase plates the number varied from 25 tot 29. In homoeotypic metaphase plates the count varied as 18, 19 etc.

CYPERACEAE (continued)	n	2n	
ELEOCHARIS (continued)			
<i>Eleocharis palustris</i> (L) R. & S.	8 ¹⁾	9	HICKS, 1929.
„ <i>palustris</i> (L) R. & S.	8 ²⁾ 9	„	„
	18 ³⁾		
„ <i>tenuis</i> (WILLD.)			
„ SCHULTZ.	19	„	„
„ <i>tuberculosa</i> (MICHX)			
„ R. & S.	15	„	„
„ sp. (from New Zealand)	10	„	„
PRINCIPES.			
PALMAE			
<i>Trachycarpus excelsus</i> WENDL.	17 ⁴⁾		SINOTO, 1929b.
„ <i>excelsus</i> WENDL.			
„ var. <i>Fortunei</i>			
„ MAK.	17 ⁵⁾	„	„
FARINOSAE			
COMMELINACEAE			
<i>Tradescantia crassifolia</i>	6		DARLINGTON, 1929b.
„ <i>crassifolia</i> CAV. . 6 + 2 ₁	12 — 2		
	frag.	„	1929e.
„ <i>fluminensis</i>	60	„	1929b.
„ <i>fluminensis</i> VELL.	60	„	1929e.
„ <i>fluminensis</i> VELL.			
„ variegated	60	„	1929e.
„ <i>geniculata</i> JACQ.	32	„	1929e.
„ <i>navicola</i>	32	„	1929b.
„ <i>navicularis</i> ORT-			
„ GIES.	32	„	1929e.
„ <i>virginiana</i>	24	„	1929b.
„ <i>virginiana</i> L.			
varieties and sub-species:			
„ <i>alba</i> (ALDENHAM)	11 — 12	„	1929e.
„ <i>alba</i> (KEW)	11 — 13	„	1929e.
„ <i>bracteata</i>	11 — 12	24	„ 1929e.
„ <i>brevicaulis</i>	7 — 11	18	„ 1929e.
„ <i>caerulea</i> (double)	24 — 1		
	frag.	„	1929e.

¹⁾ See foot-note page 237.²⁾ In material of one collection 9 chromosomes were found.³⁾ Some large plants from Heard's Pond, Wayland, Mass. had 18 chromosomes.⁴⁾ An unequal pair of chromosomes was distinguishable in meiotic divisions of male flowers.⁵⁾ An unequal pair of chromosomes was not observed with certainty in this form.

COMMELINACEAE (continued)	n	2n	
<i>Chelsea seedling</i> (No. 1) . . .		24	DARLINGTON, 1929e.
" " (No. 2) . . .		25	" 1929e.
<i>congesta</i>	11—13	24	" 1929e.
<i>delicata</i>		24	" 1929e.
<i>hirsuta</i>	11—13	24	" 1929e.
<i>humilis</i>		24—3	
		frag.	" 1929e.
<i>lilacina</i>		24	" 1929e.
<i>Medium Blue</i> (No. 1).	10—14	24—4, 5,	
		6 frag.	" 1929e.
" " (No. 4).	10—13	24	" 1929e.
<i>Montana</i>	11—14	25—2	
		frag.	" 1929e.
<i>Pale blue</i>	12		" 1929e.
<i>reflexa</i>		24	" 1929e.
<i>rubra</i>		24—3	
		frag.	" 1929e.
<i>small red</i>	11—12	24	" 1929e.
<i>Taplow Crimson</i>		24—4	
		frag.	" 1929e.
<i>Cyanotis somaliensis</i>		28	" 1929b.
" <i>somaliensis</i> C. B. CLARKE		28	" 1929e.
<i>Treleasis brevifolia</i> ROSE		24	" 1929e.
<i>Zebrina pendula</i> SCHNITZEL	8—24, 24	24	" 1929e.
<i>Coleotrype Natalensis</i> C. B. CLARKE		36	" 1929e.
<i>Rhoeo discolor</i> HANCE	12	12	" 1929e.
<i>Dichorisandra thyrsiflora</i> MIKAR.	19	38	" 1929e.
<i>Spironema fragrans</i> LINDL.		12	" 1929e.
<i>Tinantis fugax</i>		68	" 1929b.
	34	68	" 1929e.
" " (selfed seedling)		68	" 1929e.
<i>Commelina benghalensis</i>		probably 68	" 1929e.
" <i>coelestis</i>		90	" 1929b, e.
" <i>nudiflora</i>		56	" 1929e.

LILIIFLORAE

LILIACEAE

<i>Eremurus altaicus</i> (PALL.) STEV.	7	BURSTRÖM, 1929.
" <i>himalaicus</i> BAKER	7	" "
" <i>robustus</i> RGL.	7	" "
" <i>spectabilis</i> M. B. var.		" "

LILIACEAE (continued)	n	2n	
<i>Eremurus</i> (continued)			
<i>Eremurus marginatus</i> . . .	7		BURSTRÖM, 1929.
<i>Eremurus himalaicus</i> × <i>E. robustus</i> (= <i>E. „himrob”</i>)	7		“ “
<i>Funkia Sieboldiana</i>		48 ¹⁾	LI, 1929.
<i>Aloë macrantha</i>	7	14	JOHANSEN, 1929d.
<i>Hemerocallis aurantiaca</i> BAK. .	11	22	TAKENAKA, 1929.
“ <i>citrina</i>		12	STOUT & SUSA, 1929.
“ <i>disticha</i> DONN.	11	22	TAKENAKA, 1929.
“ <i>disticha</i> var. <i>Kwan-so</i> NAKAI	11—20	33	“ “
“ <i>flava</i> L.	11	22	“ “
“ <i>fulva</i> L.	11—20	33	“ “
“ <i>fulva</i> clon <i>Europa</i>	6 ²⁾	12 ³⁾	“ “
“ <i>fulva</i> fl. <i>ploeno</i>	16 ⁴⁾		SIENICKA, 1929.
“ <i>longituba</i> MIG.	11	22	“ “
“ <i>Middendorfi</i>			
“ <i>TRAUTV. et MEY.</i>	11	22	“ “
“ <i>minor</i> MILL.	11	22	“ “
“ sp. <i>α.</i>		22	“ “
“ sp. <i>B.</i>		33	“ “
<i>Aloë macrantha</i>			JOHANSEN, 1929d.
<i>Allium flavum</i> L.	8		LEVAN, 1929.
“ <i>Karataviense</i> REG.	8		“ “
“ <i>Moly</i> L.	7		“ “
“ <i>Ostrowskianum</i> REG.	8		“ “
“ <i>pulchellum</i> DON.	8		“ “
“ <i>saxatile</i> BIEB.	8		“ “
“ <i>sphaerocephalum</i> L.	8		“ “
“ <i>subtilissimum</i> LEDEB.	8		“ “
“ <i>Victorialis</i> L.	8		“ “
“ <i>yunnanense</i> DIELS	16		“ “
<i>Fritillaria imperialis</i>	24—6		DARLINGTON, 1929e.

¹⁾ The number was determined from a rough count of a few equatorial plates in the endosperm showing the triple fusion nucleus with ca. 72.

²⁾ Due to various arrangements of 12 chromosomes as 6 bivalents, 5 + 2₁, 4 + 4₁, 3 + 6₁, 2 + 8₁, 1 + 10₁, or 12₁ followed by division of some univalents, as many as 18 chromosomes have been found in microspores.

³⁾ Due to non distribution varying numbers of chromosomes were found in somatic cells, the highest number being 56.

⁴⁾ 16 Gemini were formed at diakinesis. At the heterotypic division no typical equatorial plate was formed and diads might be formed or homoeotypic division with a typical equatorial plate might follow.

LILIACEAE (continued)	n	2n	
<i>Fritillaria</i> (continued)			
<i>Fritillaria latifolia</i>	24		DARLINGTON, 1929 ^e .
" <i>ruthenica</i>	18		" "
" <i>Meleagris</i>	24		" "
<i>Tulipa Clusiana</i>		60	" "
" <i>Clusiana</i> DC.	uni-, bi-, tri-, quadri- & quinque- valents	60	NEWTON & DARLINGTON, 1929.
" sp. — <i>Keizerskroon</i>	uni-, bi- & trivalents	36	" " "
" sp. — <i>Massenet</i>	uni-, bi- & trivalents	36	" " "
" sp. — <i>Pink Beauty</i>	uni-, bi- & trivalents	36	" " "
<i>Galtonia candicans</i> DCS.	8	16	KACHIDZE, 1929 ^b .
<i>Ornithogalum narbonense</i>		14, 28	SPRUMONT, 1928.
" <i>nutans</i>		16	" "
" <i>pyrenaicum</i>		32, 64	" "
" <i>umbellatum</i>		32 & 64	" "
" <i>umbellatum</i>		27, 45	" "
<i>Hyacinthus orientalis</i> var. <i>Aren-</i> <i>tine Arendsen</i>		28	DARLINGTON, 1929 ^d .
" <i>orientalis</i> var. <i>City</i> <i>of Haarlem</i>		23	" "
" <i>orientalis</i> var. <i>Grand</i> <i>Maitre</i>	12 ₃		BELLING, 1929.
" <i>orientalis</i> var. <i>King</i> <i>of the Blues</i>	12 ₃	24	DARLINGTON, 1929 ^d .
" <i>orientalis</i> var. <i>La</i> <i>Grandesse</i>		28	" "
" <i>orientalis</i> var. <i>La</i> <i>Peyrouse</i>		26	" "
" <i>orientalis</i> var. <i>Lady</i> <i>Derby</i>	12 ₃		BELLING, 1929.
" <i>orientalis</i> var. <i>L'In-</i> <i>nocence</i>	12 ₃	24	DARLINGTON, 1929 ^d .
" <i>orientalis</i> var. <i>Mar-</i> <i>coni</i>		24	BELLING, 1929.
" <i>orientalis</i> var. <i>Mo-</i> <i>reno</i>		24	DARLINGTON, 1929 ^d .
			" "

LILIACEAE (continued)	n	2n	
<i>Hyacinthus</i> (continued)			
<i>Hyacinthus orientalis</i> var. <i>Nimrod</i>		19	DARLINGTON, 1929d.
" <i>orientalis</i> var. <i>Queen of the Pinks</i> . . .		24	" "
" <i>orientalis</i> var. <i>Roi des Belges</i>		24	" "
" <i>orientalis</i> var. <i>Totula</i>		30	" "
<i>Yucca filamentosa</i> L.	30		MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA & YAMASAKI, 1929.
<i>Asparagus officinalis</i> L. . . .	10	20	KAMO, 1929.
" <i>officinalis</i> L. ♀ & ♂	10		SHOJI & NAKAMURA, 1928.
<i>Smilax herbacea</i>		13	LINDSAY, 1929.
AMARYLLIDACEAE			
<i>Haemanthus Katharinae</i>	9		WOYCICKI, 1929.
<i>Narcissus Balbocodium</i> var.			
" <i>Common Hooped Petticoat</i> " (double flowered)		14	NAGAO, 1929a.
" <i>Balbocodium</i> var. „ <i>Conspicuous</i> " ¹⁾		21	" "
" <i>Balbocodium</i> var. „ <i>Androecium of Balbocodium</i> "		42	" "
" <i>incomparabilis</i> var. „ <i>Nelson Major</i> "		14	" "
" <i>incomparabilis</i> var. „ <i>Gloria Mundi</i> "		21	" "
" <i>incomparabilis</i> var. „ <i>Sir Watkin</i> "		21	" "
" <i>jonquilla</i> (double flowered)		14	" "
" <i>poeticus</i> var. „ <i>Poetarum</i> "	7 ₃ ²⁾	21	" "
" <i>poeticus</i> var. <i>poetarum</i>	7 ₃ ³⁾		" 1929b.
" <i>poetaz</i> var. „ <i>Elvira</i> "?		25	" 1929a.
<i>Bellevallia speciosa</i> G. WOR. . . .	4	8	DELAUNAY, 1928.

¹⁾ NAGAO 1929 stated that this named variety was classified by some authors as some other species.

²⁾ Sometimes 1 to several univalents were among the trivalents so that 8, 9 or 10 chromosomal units may be counted in the nuclear plate. The chromosome numbers in the homeotypic plates were 10 and 11 and 10 and 12.

³⁾ Sometimes univalent and bivalent chromosomes appeared with the trivalents.

AMARYLLIDACEAE (cont'd)		n	2n	
<i>Muscari acutifolium</i> Boiss. . .		9	18	DELAUNAY, 1928.
„ <i>forniculatum</i> FOMIN . . .		9		
„ <i>longipes</i> Boiss.		9	18	„ „
„ <i>tenuiflorum</i> TAUSCH . . .		9	18 ¹⁾	„ „ ; KACHIDZE, 1929b.
<i>Narcissus Pseudonarcissus</i> var.				
„ „Albicano”			14	NAGAO, 1929a.
„ <i>Pseudonarcissus</i> var.				
„ „Empress”			22	„ „
„ <i>Pseudonarcissus</i> var.				
„ „Golden Spur”			30	„ „
„ <i>Pseudonarcissus</i> var.				
„ „Grandee”			ca. 22	„ „
„ <i>Pseudonarcissus</i> var.				
„ „King Alfred”			28	„ „
„ <i>Pseudonarcissus</i> var.				
„ „Olympia”			28	„ „
„ <i>Pseudonarcissus</i> var.				
„ „Victoria”			14	„ „
„ <i>tazetta</i> var. (a „bico- lores” type)			20	„ „
„ <i>tazetta</i> var. (an „al- bae” type)			22	„ „
„ <i>tazetta</i> var. „Luna” . . .			ca. 32	„ „
<i>Agave Sisalana</i> PERRINE . . .			14	CATALANO, 1929.
<i>Alstroemeria aurantiaca</i> . . .	8		16	WHYTE, 1929a.
„ <i>brasiliensis</i>	8		16	„ „
„ <i>haemantha</i>	8		16	„ „
„ <i>pulchella</i>	8		16	„ „
<i>Bomarea Banksii</i> (B. Calda- siana × B. pataco- censis	9 ²⁾		18	„ „
„ <i>cantabrigiensis</i> (B. Caldasiana × B. <i>edulis</i>)	9 ²⁾		18	„ „
„ <i>Matthewsii</i> (B. Car- deri × B. <i>edulis</i>) . . .	9 ²⁾		18	„ „
„ <i>Whittonii</i> (B. <i>edulis</i> × B. <i>Carderi</i>)	9 ²⁾		18	„ „

¹⁾ KACHIDZE (1929b) found that there were 2 pairs of satellites in the homozygous and 1 pair in the heterozygous race.

²⁾ Generally there were no abnormalities in the meiotic prophase but occasionally one or 2 bivalents were loosely paired.

IRIDACEAE		n	2n	
<i>Iris acutiloba</i>	C. A. M.		20	DELAUNAY, 1928.
"	<i>caucasica</i> HOFFM.		18	" "
"	<i>cypriana</i> FOSTER & BAKER	24	48	SIMONET, 1929a.
"	<i>florentina</i> L.	12	24	" "
			48 ¹⁾	KAZAO, 1929.
"	<i>germanica</i> L. de Verone			
	Hort.	16+12 ₁	44	SIMONET, 1929c.
"	<i>germanica</i> L. Col du Chat			
	Hort.	14+16 ₁	44	" "
"	<i>germanica</i> L. var. Kharput			
	Hort.	16+12 ₁	44	" "
"	<i>germanica</i> L. var. <i>Coerulea</i>			
	Hort.	16+12 ₁	44	" "
"	<i>germanica</i> L. var. <i>Erebe</i>			
	Hort.	16+12 ₁	44	" "
"	<i>germanica</i> L. var. <i>Alba</i>			
	Hort. (= <i>I. florentina</i>			
	KER-GAWL)	16+13 ₁	45	" "
"	<i>gracilipes</i> A. GRAY	18	36	KAZAO, 1929.
"	<i>japonica</i> THUNB.		54 ¹⁾	" "
"	<i>hyrcana</i> G. WOR.		20	DELAUNAY, 1928.
"	<i>iberica</i> HOFFM.		20	" "
"	<i>Kaempferi</i> SIEB. var. <i>Chd-</i>			
	<i>seiden</i>	12	24	INARIYAMA, 1929.
"	<i>Kaempferi</i> SIEB. var. <i>Edo-</i>			
	<i>jiman</i>		24	" "
"	<i>Kaempferi</i> SIEB. var. <i>Gyo-</i>			
	<i>kuhoren</i>		24	" "
"	<i>Kaempferi</i> SIEB. var. <i>hor-</i>			
	<i>tensis</i> MAKINO	12	24	KAZAO, 1929.
"	<i>Kaempferi</i> SIEB. var. <i>Iwa-</i>			
	<i>to-no-hikari</i>		24	" "
"	<i>Kaempferi</i> SIEB. var. <i>Juni-</i>			
	<i>hitoe</i> Subf. <i>pentapetala</i> . .	12	24	" "
"	<i>Kaempferi</i> SIEB. var. <i>Ku-</i>			
	<i>rokumo</i>	12	24	" "
"	<i>Kaempferi</i> SIEB. var. <i>Man-</i>			
	<i>dai-no-nami</i>	12	24	" "
"	<i>Kaempferi</i> SIEB. var. <i>Mat-</i>			
	<i>subagasane</i>		24	" "
"	<i>Kaempferi</i> SIEB. var. <i>Na-</i>			
	<i>nakomachi</i>	12	24	" "

¹⁾ Meiotic divisions in pollen-mother-cells of this species were quite irregular. A number of trivalent chromosomes were found.

IRIDACEAE (continued)	n	2n	
<i>Iris</i> (continued)			
<i>Iris Kaempferi</i> SIEB. var. <i>No-</i> <i>hanashōbu</i>	12	24	KAZAO, 1929.
" <i>Kaempferi</i> SIEB. var. <i>Ona-</i> <i>rumi</i>		24	" "
" <i>Kaempferi</i> SIEB. var. <i>Shi-</i> <i>ga-no-uranami</i>	12	24	" "
" <i>Kaempferi</i> SIEB. var. <i>spon-</i> <i>tanea Makino</i>	12	24	" "
" <i>Kaempferi</i> SIEB. var. <i>Sui-</i> <i>bijin</i>	12	24	" "
" <i>Kaempferi</i> SIEB. var. <i>Za-</i> <i>ma-no-mori</i>	12	24	" "
" <i>Kaempferi</i> SIEB. var. ¹⁾		24	" "
" <i>laevigata</i> FISH.	16		INARIYAMA, 1929.
" <i>laevigata</i> FISH. et MEY.	16	32	KAZAO, 1929.
" <i>macrantha</i> HORT. (ANAS)	24	48	SIMONET, 1929a.
" <i>pallida</i> LAM.	12	24	" "
" <i>paradoxa</i> STEV.		20	DELAUNAY, 1928.
" <i>reticulata</i> M. B.		20	" "
" <i>Schelkownikowii</i> FOMIN.		20	" "
" <i>sibirica</i> L. var. <i>orientalis</i> <i>MAKINO</i>	14	28	KAZAO, 1929.
" <i>trojana</i> A. KERN	24	48	SIMONET, 1929a.
" <i>variegata</i> L.	12	24	" "
" <i>Winogradowii</i> FOMIN.		16	DELAUNAY, 1928.
Section <i>Gynandris</i>			
<i>Iris tuberosa</i> L. (<i>Hermodactylus</i> <i>tuberosa</i> MILL.) ²⁾		20	SIMONET, 1929b.
Section <i>Pogoniris</i>			
<i>Iris Alberti</i> REGEL		12	" 1929d.
" <i>Alberti</i> REGEL var. <i>semper-</i> <i>florens</i> HORT.	12		" "
" <i>albicans</i> LANGE		44	" "
" <i>chamaeiris</i> BERTOL.	20		" 1929c.
" <i>kashmiriana</i> BAKER		51	" 1929d.
" <i>Kochii</i> A. KERNER		44	" "
" <i>olbiensis</i> HENON	20		" 1929c.
" <i>pumila</i> L.	18	36	" "
" <i>pumila</i> HORT. var. <i>caerulea</i> HORT. = var. <i>cyanea</i> HORT. ³⁾	20		" "

¹⁾ Five unnamed varieties were found to have 24 diploid chromosomes.²⁾ This was included by SIMONET (1928a) under the latter name.³⁾ Often two rarely four univalents were found on the equatorial plate.

IRIDACEAE (continued)		n	2n	
<i>Iris</i> (continued)				
<i>Iris pumila</i> Hort. var. <i>Rupert</i>				
Hort. ¹⁾	20			SIMONET, 1929c.
" <i>Ricardi</i> Hort.		48		" 1929d.
" <i>subbiflora</i> BROT.		40		" "
" <i>subbiflora</i> BROT. var. <i>Major</i> Hort.		40		" "
" <i>virescens</i> DC.	20			" 1929c.
	$9+18_1$			
	$\frac{2}{2}$			
	$10+16_1$			
	$\frac{2}{2}$			
	$11+14_1$			
	$\frac{2}{2}$			
Section <i>Evansia</i>				
<i>Iris milesii</i> BAKER		26		" "
Section <i>Apogon</i>				
<i>Iris spuria</i> L. var. <i>maritima</i>				
LAM.		38		" "
" <i>Wilseni</i> WRIGHT.		40		" "
Section <i>Regelia</i>				
<i>Iris Korsikowi</i> REGEL var. <i>concolor</i> Hort.				
		44		" "
" <i>Korsikowi</i> REGEL var. <i>violacea</i> Hort.		22		" "
" <i>Leichtlini</i> REGEL		44		" "
Section <i>Junio</i>				
<i>Iris bucharica</i> FOSTER	11			" "
" <i>orchioides</i> CAR.		22		" "
" <i>sindjarensis</i> BOISS. et HAUSS.		22		" "
Section <i>Xiphion</i>				
<i>Iris Tingitana</i> BOISS.	21 ²⁾			
" " "		28 ³⁾		" "
" " " var. <i>Fon- tanesii</i> G. G.	14	28 ⁴⁾		" "
Hybrids:				
— " <i>Alcazar</i> " (VILMORIN, 1909)		48		" 1929a.
— " <i>Alhambra</i> " (VILMORIN, 1907)		50		" "

¹⁾ See foot-note 3 page 245.²⁾ In the homoeotypic equatorial plates 19 and 23 or 20 and 22 chromosomes were found.³⁾ In one form this number was found.⁴⁾ In certain roots 56 as well as 28 chromosomes were found as the diploid number.

IRIDACEAE (continued)	n	2n	
Hybrids (continued)			
— „Allies” (VILMORIN, 1920) .		35	SIMONET, 1929a.
— „Ambassadeur” (VILMORIN, 1915) ¹⁾		50	„ „
— „Dominion” (BLISS, 1919) .		50	„ „
— „Isoline” (VILMORIN, 1904)		36	„ „
<i>Iris Jacquesiana</i>		24	„ „
<i>Iris Koenig</i> (GOOS et KOENEMANN, 1907).		25	„ 1929c.
— LENT A. WILLIAMSON (WILLIAMSON, 1916) ²⁾ . . .		50	„ 1929a.
<i>Iris</i> „Magnifica” (VILMORIN, 1914)		62	„ „
„ „Magnifica” (VILMORIN, 1914)	$25 + \frac{12_1}{2}$	62	„ 1929c.
— „Shelford Chieftain” (FOS-TER, 1909).		49	„ 1929a.
— „Souvenir de Madame Gaudichau” (MILLET, 1914). .		47	„ „
— „Tamerlan” (VILMORIN, 1909)		48	„ „
<i>Iris Zwanenburg</i> (F. DENIS, 1909 or 1912) = (<i>I. lutescens</i> LAM. var. <i>aurea</i> Hort. × <i>I. susiana</i> L.) .	$12 + \frac{18_1}{2}$	42	„ 1929c.
	$10 + \frac{22_1}{2}$		„ „
	$11 + \frac{20_1}{2}$		„ „
	$13 + \frac{16_1}{2}$		„ „
<i>Iris pumila</i> Hort. × <i>I. germanica</i> Hort.			
— <i>Dauphin</i> (CAPARNE, 1901) .		44	„ „
— <i>Diamond</i> (CAPARNE, 1901) .		44	„ „
— <i>Dorothee</i> (CAPARNE, 1901) .		44	„ „
— <i>Ingeborg</i> (GOOS et KOENEMANN, 1908)		44	„ „
— <i>Ivorine</i> (CAPARNE, 1901). .		44	„ „
— <i>Odine</i> (CAPARNE, 1901) . .		44	„ „

¹⁾ In somatic metaphases 2 satellites were found.²⁾ In somatic metaphases 5 satellites were found.

SCITAMINEAE	n	2n	
MUSACEAE			
<i>Musa Basjo</i> SIEB.		11	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
CANNACEAE			
<i>Canna aureo-vittata</i>	9		HONING, 1928.
„ <i>aureo-vittata gigas</i>	18, 94 or tetra-, bi- and uni- valents		„ „
„ <i>glauca</i>	9		„ „
„ <i>indica</i>	9		„ „
„ <i>glauca</i> × <i>C. indica</i>	9		„ „
ZINGIBERACEAE			
<i>Zingiber Mioga</i> Rosc.	28	55?	MORINAGA, FUKUSHIMA, KANÔ, MARUYAMA, YAMASAKI, 1929.
MICROSPERMAE			
ORCHIDACEAE			
DIANDRAE			
<i>Cypripedium spectabile</i>	11		HOFFMANN, 1929.
„ „ <i>Blenheimense</i> ”		24	„ „
<i>Phragmopedium Sedenii</i> (Phr. <i>Schlimii</i> × <i>Phr. longifolium</i>)		24	„ „
<i>Paphiopedilum Chamberlainia-</i> <i>num</i>		24	„ „
„ <i>insigne</i> ¹⁾	16	32	„ „
MONANDRAE			
<i>Acrotonae</i>			
POLYCHONDRAEAE			
<i>Vanilla planifolia</i>		ca. 32	„ „
<i>Listera ovata</i>	17		„ „
„ <i>ovata</i> R. Br.	17 ²⁾	34 ³⁾	TUSCHNJAKOVA, 1929a. STANER, 1929.
KEROSPHAEREAE			
<i>Stelis atropurpurea</i>	16		HOFFMANN, 1929
<i>Phyosiphon carinatus</i>	ca. 16		„ „
„ <i>Loddigesii</i>	ca. 16		„ „
<i>Coelogyne fimbriata</i>	20		„ „
„ <i>flexuosa</i>	20		„ „
„ <i>fuliginosa</i>	20		„ „
<i>Dendrochilum glumanum</i>	20		„ „
<i>Pholidota conchoidea</i>	20		„ „

¹⁾ Five different plants gave this number.²⁾ In a few cells 16 or 18 chromosomes were found.³⁾ In several plates 36 chromosomes were counted.

ORCHIDACEAE (continued)		n	2n	
<i>Epidendrum raniferum</i>		20		HOFFMANN, 1929.
<i>Laeliocattleya Canhamiana</i> (<i>Cattleya Mossiae</i> × <i>Laelia purpurata</i>) × <i>Laelia tenebrosa superba</i>		20		" "
<i>Dendrobium chrysotomum</i> . . .		20		" "
" <i>infundibulum</i> . . .		20		" "
" <i>thyrsoflorum</i> . . .		20		" "
" <i>Wardianum</i> var. <i>giganteum</i> . . .			40	" "
PLEURANTHAE				
<i>Bulbophyllum saurocephalum</i> .		20		" "
<i>Cymbidium Lowianum</i>		20		" "
<i>Stanhopea insignis</i>		20		" "
" <i>tigrina</i>		20		" "
<i>Lycaste aromatica</i>		20		" "
<i>Bifrenaria Harrisoniae</i>			40	" "
<i>Zygopetalum Mackayi</i>	ca. 24			" "
<i>Koellensteinia graminea</i>			ca. 48	" "
<i>Ornithidium demum</i>	24			" "
<i>Oncidium bicallosum</i>	14			" "
" <i>flexuosum</i>			56	" "
" <i>varicosum</i>	28			" "
<i>Vanda suavis</i> LDL.	ca. 16			" "
" <i>tricolor</i> LDL.			ca. 16	" "

BIBLIOGRAPHY

- ASANA, J. J. & R. N. SUTARIA, 1929. — A cytological study of pollen development in *Carica papaya* LINN. Jour. Indian Bot. Soc. (Madras) 8; 235—44, Pl. I, II.
- AVERY, P. 1929. — Chromosome number and morphology in *Nicotiana*. IV. The nature and effects of chromosomal irregularities in *N. alata* var. *grandiflora*. Univ. Calif. Pub. Bot. 11; 15, 265—84.
- BABCOCK, E. B. & J. CLAUSEN, 1929. — Meiosis in two species and three hybrids of *Crepis* and its bearing on taxonomic relationship. Univ. Calif. Pub. Agr. Sci. 2; 15, 401—32, Pl. LVIII—LXI.
- BANERJI, I., 1929. — The chromosome numbers of Indian cottons. Ann. Bot. 43; 603—7.
- BANGHAM, W. 1929. — The chromosomes of some species of the genus *Philadelphus*. Jour. Arnold Arboretum 10; 167—9.
- BEADLE, G. W. 1929. — A gene for supernumerary mitoses during spore development in *Zea Mays*. Science 70; 406—7.
- BELLING, J. 1929. — Nodes and internodes of trivalents of *Hyacinthus*. Univ. Calif. Publ. Bot. 14; 18, 379—88.
- BLAKESLEE, F. 1929. — Cryptic types in *Datura* due to chromosomal interchange and their geographical distribution. Jour. Hered. 20; 177—90.
- BLANCHARD, F. C. 1929. — The genetical constitutions of *Oenothera pratincola* and its revolute leaved mutations. Jour. Wash. Acad. Sci. 19; 115—25.
- BREMER, G. 1929. — Remarks on the cytology of *Saccharum*. Facts About Sugar, New York, 24; 926—7.
- BRESLAUWETZ, L. 1929. — Zytologische Studien über *Melandrium album* L. Planta 7; 444—60.
- BURSTRÖM, H. 1929. — Zytologische Studien innerhalb der Gattung *Eremurus*. Acta Horti Bergiani 9; 293—302.
- CAPPELLETTI, C. 1929. — Sterilità di origine micotica nella *Ruta patavina* L. Ann. di Bot. Roma 18; 145—66, Pl. VI—VII.
- CATALANO, G. 1929. — Megasporogenesi aberrante in *Agave Sisalana* PERINE. Nuovo Giorn. Bot. Ital. N. Ser. 36; 317—24.
- CHRISTOFF, M. 1929. — Cytological studies on some species of *Vitaceae*. Bull. Soc. Bot. Bulgaria 3; 279—85.
- CHURCH, G. L. 1929a. — Meiotic phenomena in certain *Gramineae*. I. *Festu-*

- ceae, Aveneae, Agrostideae, Chlorideae and Phalarideae. Bot. Gaz. 87; 608—29, Pl. XXV—XXVII.
- CHURCH, G. L. 1929b. — Meiotic phenomena in certain Gramineae. II. *Panicaceae* & *Andropogoneae*. Bot. Gaz. 88; 63—84, Pl. IV—VI.
- CLARK, C. F. 1929. — A *Solanum* hybrid. Jour. Hered. 20; 391—4.
- CLAUSEN, J. 1929. — Chromosome number and relationship of some North American species of *Viola*. Ann. Bot. 43; 741—64.
- CLELAND, R. E. 1929. — Chromosome behavior in the pollen mother cells of several strains of *Oenothera Lamarckiana*. Zeitschr. Indukt. Abst. Vererb. lehre 51; 126—45, Pl. I—II.
- CLELAND, R. E. & F. OEHLKERS, 1929. — New evidence bearing upon the problem of the cytological basis for genetical peculiarities in the *Oenotheras*. Amer. Nat. 63; 497—510.
- CLAUSEN, R. E. & W. E. LAMMERTS, 1929. — Interspecific hybridization in *Nicotiana* X. Haploid and diploid merogony. Amer. Nat. 63; 279—82.
- COLLINS, J. L., HOLLINGSHEAD, L. & P. AVERY, 1929. — Interspecific hybrids in *Crepis*. III. Constant fertile forms containing chromosomes derived from two species. Genetics 14; 305—20.
- COOPER, D. C. 1929. — The chromosomes of *Buginvillaea*. Proc. Nat. Acad. S i. 15; 885—7.
- CRANE, M. B. 1929. — Polyploidy and sterility in cultivated fruits. John Innes Hort. Inst. Conference on Polyploidy 38—41.
- CRANE, M. B. & W. I. C. LAWRENCE, 1929. — Genetical and cytological aspects of incompatibility and sterility in cultivated fruits. Jour. Pomol. & Hort. Sci. 7; 276—301, Pl. I, II.
- DARLINGTON, C. D. 1929a. — A comparative study of the chromosome complement in *Ribes*. Genetica 11; 267—72.
- DARLINGTON, C. D. 1929b. — Ring formation in *Oenothera* and other genera. Jour. Genetics 20; 345—63.
- DARLINGTON, C. D. 1929c. — Polyploids and polyploidy. Nature 124; 98—100.
- DARLINGTON, C. D. 1929d. — Part II. Aneuploid hyacinths. Jour. Genetics 21; 17—26, Pl. I—V.
- DARLINGTON, C. D. 1929e. — Chromosome behaviour and structural hybridity in the *Tradescantiae*. Jour. Genet. 21; 207—86.
- DAVENPORT, C. B. 1928. — Carnegie Institute Year Book 27; 35—44.
- DELAUNAY, L. N. 1928. — The use of karyological analysis for the solution of special questions of systematic botany. NAWASCHIN Jubilee Volume, State Timiriazeff Institute, Moscow; 3—14, Pl. I.
- DORSEY, M. J. 1914. — Pollen development in the grape with special reference to sterility. Minn. Agr. Exp. Sta. Bull. 144; 1—60, Pl. I—IV.
- EDMAN, G. 1929. — Zur Entwicklungsgeschichte der Gattung *Oxyria* HILL. nebst zytologischen embryologischen und systematischen Bemerkungen über einige andere Polygonaceen. Acta Horti Bergiani 9; 165—291.
- EIG, A. 1929. — Monographisch-kritische Übersicht der Gattung *Aegilops*. Repert. spec. nov. regni. vegetabilis Fedde Beih. 55; 1—288.

- EKMAN, E. 1929. — Studies in the genus *Draba*. Svensk. Bot. Tids. 23; 476—95.
- EMERSON, R. A. 1929. — Genetic notes on hybrids of perennial teosinte and maize. Amer. Nat. 63; 289—300.
- EMERSON, S. H. 1929. — The reduction division in a haploid *Oenothera*. La Cellule 39; 157—165, Pl. I.
- ERLANSON, E. W. 1929. — Cytological conditions and evidences for hybridity in North American Wild Roses. Bot. Gaz. 87; 443—506, Pl. XVI—XIX.
- FAWOROW, A. 1929. — Hylogenetische Untersuchung der *Sorghum*-Arten. (Russ. with German Summary). Wissenschaftliche Arbeiten (Odessa) 1; 51—63.
- FUKUSHIMA, E. 1929. — Preliminary report on *Brassica-Raphanus* hybrids. Proc. Imp. Acad. Tokyo V; 48—50.
- GAISER, L. O. 1926. — A list of chromosome numbers in angiosperms. Genetica 8; 401—84.
- GAISER, L. O. 1930. — Chromosome numbers in angiosperms. II. Bibliographia Genetica 6; 171—466.
- GATES, R. R. 1929. — A haploid *Oenothera*. Nature 124; 948.
- GATES, R. R. & F. M. SHEFFIELD. 1929. — Megaspore development in *Oenothera rubricalyx* with a note on chromosome linkage in *Oenothera angustissima*. Proc. Roy. Soc. Sec. B. 105; 499—517, Pl. XXVII—XXIX.
- GEITLER, L. 1929a. — Zur Zytologie von *Crepis*. Zeitschr. Wiss. Biol. Abt. B. Zeitschr. Zellforsch. Mikros. Anat. 9; 287—96.
- GEITLER, L. 1929b. — Der feinere Bau der Chromosomen von *Crepis*. Zeitschr. Wiss. Biol. Abt. B. Zeitschr. Zellforsch. Mikros. Anat. 10; 195—200.
- GHIMPU, V. 1929a. — Contribution à l'étude des satellites du genre *Hordeum*. C. R. Soc. Biol. Paris 100; 187—90.
- GHIMPU, V. 1929b. — Contribution à l'étude chromosomique des *Acacia*. C. R. Acad. Sci. 188; 1429—31.
- GHIMPU, V. 1929c. — La caryologie des plantes cultivées. Bull. de l'Agric. Roumania 2 Ser. 10; 149—74.
- GHIMPU, V. 1929d. — Sur la caryologie du genre *Medicago*. Bull. de l'Agric. Roumania 2 Ser. 10; 175—8.
- GHIMPU, V. 1929e. — Sur l'existence simultanée des mitoses diploides didiploides et tétraploides chez les *Acacia*. C. R. Soc. Biol. 101; 1122—3.
- GHIMPU, V. 1929f. — Orges diploides et tétraploides. C. R. Sci. de l'Acad. d'Agric. de France 15; 818—21.
- GHIMPU, V. 1929g. — Sur les chromosomes de quelques chênes. Rev. Bot. Appl. et d'Agric. Trop. 9; Bull. 91; 176—9.
- GIGANTE, R. 1929. — Embriologia dell' *Acanthus Mollis* L. Nuovo Giorn. Bot. Ital. N. Ser. 36; 5—33, Pl. I—X.
- GOODSPEED, T. H. 1929a. — Cytological and other features of variant plants produced from X-rayed sex cells of *Nicotiana Tabacum*. Bot. Gaz. 87; 563—82.

- GOODSPEED, T. H. 1929b. — The effects of X-rays and radium. Jour. Hered. 20; 243—59.
- GOODSPEED, H. & P. AVERY, 1929a. — The occurrence of chromosome variants in *Nicotiana glauca* L. et OTTO. Proc. Nat. Acad. Sci. 15; 343—5.
- GOODSPEED, T. H. & P. AVERY, 1929a. — The occurrence of a *Nicotiana glutinosa* haplont. Proc. Nat. Acad. Sci. 15; 502—4.
- GORCZYŃSKI, T. 1929. — Recherches histo-cytologiques sur les fleurs cléistogames chez *Lamium amplexicaule*, *Oxalis acetosella* et *Viola odorata*. Acta Soc. Bot. Polon. 6; 248—95, Pl. XV—XVII.
- GRECO, R. 1929. — Notizie preliminari sull' embriologia e la cariologia del *Myrtus communis* L. Nuovo Giorn. Bot. Ital. N. Ser. 36; 57—9.
- HAASE-BESSELL, G. 1929. — Chromosomenüberkreuzungen bei der Rose „Konrad Ferdinand Meyer“. Zeitschr. Ind. Abst. Vererbgs. 49; 146—62.
- HÅKANSSON, A. 1929a. — Chromosomenringe in *Pisum* und ihre mutmassliche genetische Bedeutung. Hereditas 12; 1—10.
- HÅKANSSON, A. 1929b. — Bemerkungen über die somatischen Chromosomen von *Bunias orientalis* L. Bot. Not.; 52—4.
- HÅKANSSON, A. 1929c. — Die Chromosomen in der Kreuzung *Salix viminalis* × *caprea* von HERIBERT NILSSON. Hereditas 13; 1—52.
- HÅKANSSON, A. 1929d. — Über verschiedene Chromosomenzahlen in *Scirpus palustris* L. Hereditas 12; 53—60.
- HEIMLICH, L. F. 1929. — Microsporogenesis in *Cucumis sativus*. La Cellule 39; 1—24, Pl. I—III.
- HEITZ, E. 1929a. — Heterochromatin, Chromocentren, Chromomeren. Ber. Deu. Bot. Ges. 47; 274—84, Pl. V.
- HEITZ, E. 1929b. — Gibt es Sammelchromosomen bei Pflanzen? Planta 8; 527—8.
- HICKS, G. 1929. — Cytological studies in *Cyperus*, *Eleocharis*, *Dulichium* and *Eriophorum*. Bot. Gaz. 88; 132—49, Pl. VIII—IX.
- HIRAYANAGI, H. 1929. — Chromosome arrangement. III. The pollen mother cells of the vine. Mem. Coll. Sci. Kyoto Imp. Univ. Ser. B. 4; 273—81.
- HITCHCOCK, A. S. 1920. — The genera of grasses of the United States. U. S. Dept. Agr. Bull. 772.
- HOEG, E. 1929. — Om mellemformerne mellem *Quercus robur* L. og *Q. sessiliflora* MARTYN. Bot. Tids. Copenhagen 40; 411—27.
- HOEPPENER, E. & O. RENNER, 1929. — Genetische und zytologische Oenotherenstudien. Bot. Abhandlungen herausgegeben von K. GOEBEL, Hft. 15; 1—86, Pl. I—VII.
- HOFFMANN, K. 1929. — Cytologische Studien bei den Orchidaceen. Ber. Deu. Bot. Ges. 42; 321—6.
- HOLLINGSHEAD, L. 1929. — Chromosome number and morphology in *Nicotiana*. III. The somatic chromosomes of *N. longiflora* Cav. Univ. Calif. Pub. Bot. 14; 257—64.
- HONING, J. A. 1928. — *Canna* crosses. II. The chromosome numbers of *Canna glauca*, *C. glauca* × *indica*, *C. aureo-vittata* and *C. aureo-vittata* gigas. Mededeel. Landb. Wageningen 32; (4), 1—14.

- HUSKINS, C. L. 1929. — *Primula juliae* and its hybrids with the primrose and the oxlip. Jour. Roy. Hort. Soc. 54; 95—100.
- IKENO, S. 1929. — Über die Resultate der Kreuzung von zwei *Plantago*-Arten. Jap. Jour. Bot. 4; 303—16.
- ILLICK, J. T. 1929. — A cytological study of meiosis in the pollen mother cells of some *Oenotheras*. Genetics 14; 591—633, Pl. I—V.
- INARIYAMA, S. 1929. — Karyological studies of *Iris Kaempferi* SIEB. Jap. Jour. Bot. 4; 405—26, Pl. XXXV—XXXVII.
- INOUE, C. 1929. — Studies on the development of chromosomes in *Linum* (Japanese). Proc. Crop Sc. Soc. Japan 3; 39—56, Pl. I. From the summary Jap. Jour. Bot. 4; (86).
- ISHII, T. 1929. — Pollen development in *Mamillaria* sp. Bot. Mag. Tokyo 43; 560—1.
- JARETZKY, R. 1929. — Die Chromosomenzahlen in der Gattung *Matthiola*. Ber. Deu. Bot. Ges. 47; 82—5.
- JENKINS, J. A. 1929. — Chromosome homologies in wheat and *Aegilops*. Amer. Jour. Bot. 16; 238—45.
- JOHANSEN, D. A. 1929a. — Studies on the morphology of *Onagraceae*. I. The metagametophyte of *Hartmannia Tetraptera*. Bull. Torr. Bot. Club. 56; 285—98, Pl. XI.
- JOHANSEN, D. A. 1929b. — A proposed phylogeny of the *Onagraceae* based primarily on number of chromosomes. Proc. Nat. Acad. Sci. 15; 882—5.
- JOHANSEN, D. A. 1929c. — New chromosome numbers in the *Onagraceae*. Amer. Jour. Bot. 16; 595—7.
- JOHANSEN, D. A. 1929d. — The chromosomes of *Aloë macrantha*. Jour. Cactus & Succ. Soc. Amer. 1 (6); 8—9.
- KACHIDZE, N. 1929a. — Karyologische Studien über die Familie *Dipsacaceae*. Planta 7; 482—502.
- KACHIDZE, H. 1929b. — The observations on the development of endosperm in the nucleodimorphic species of *Muscari* J. NAWASCHIN Jubilee volume, State Timiriazeff Institute Moscow; 189—96, Pl. III.
- KAGAWA, F. 1929a. — A study on the phylogeny of some species in *Triticum* and *Aegilops* based upon the comparison of chromosomes. Jour. Coll. Agr. Imp. Univ. Tokyo. 10; 173—228, Pl. VII—XI.
- KAGAWA, F. 1929b. — Cytological studies on the pollen formation of the hybrids between *Triticum* and *Aegilops*. Jap. Jour. Bot. 4; 345—61, Pl. XXXII—XXXIV.
- KAGAWA, F. 1929c. — On the phylogeny of some cereals and related plants as considered from the size and shape of chromosomes. Jap. Jour. Bot. 4; 363—83.
- KAGAWA, F. 1929d. — Studies of the size of chromosomes in relation to the phylogeny of crop plants. (Japanese). Proc. Crop Sc. Soc. Japan 3; 17—24. From Summary Jap. Jour. Bot. 4; (87).
- KAMO, I. 1929. — Einige Beobachtungen über die Chromosomen von *Asparagus officinalis* L. Bot. Mag. Tokyo 43; 127—3.

- KANÔ, T. 1929. — Études cytologiques sur les *Convolvulacées*. (Japanese). Proc. Crop Sc. Soc. Japan 4; 15—21 from summary Jap. Jour. Bot. 4; (88).
- KARPECHENKO, G. D. 1929a. — Konstantwerden von Art und Gattungsbastarden durch Verdoppelung der Chromosomen Komplexe. Der Züchter 1; 133—40.
- KARPECHENKO, G. D. 1929b. — A contribution to the synthesis of a constant hybrid of three species. (Russ. with Eng. Summary), Proc. U.S.S.R. Congress Genet. Plant and Animal Breed., II; 277—94.
- KARPECHENKO, G. D. and S. A. SHCHAVINSKAIA, 1929. — On sexual incompatibility of tetraploid hybrids. (Russ. with Eng. Summary). Proc. U.S.S.R. Congress Genet.. Plant and Animal Breed, II; 267—276.
- KAZAO, N. 1929. — Cytological studies on *Iris*. Sci. Rep. Tohoku Imp. Univ. 4 Ser. 4; 543—9.
- KIHARA, H. 1929a. — The sex chromosomes of *Humulus japonicus* (Japanese). Jap. Jour. Genetics 4; 55—63. From summary Jap. Jour. Bot. 4; (88).
- KIHARA, H. 1929b. — Conjugation of homologous chromosomes in the genus hybrids *Triticum* × *Aegilops* and species hybrids of *Aegilops*. Cytologia 1; 1—15.
- KOBEL, F. 1929a. Zytologische Untersuchungen als Grundlage für die Immunitätszüchtung bei der Rebe. Landw. Jahrb. Schweiz. 43; 231—72, Pl. I—IV.
- KOBEL, F. 1929b. — Die cytologischen und genetischen Voraussetzungen für die Immunitätszüchtung der Rebe. Der Züchter 1; 197—202.
- KOSTOFF, D. 1929. — An androgenetic *Nicotiana* haploid. Zeitschr. Zellforsch. Mikro. Anat. Zeitschr. Wiss. Biol. Abt. B. 9; 640—2.
- KOSTOFF, D. & J. KENDALL, 1929. — Irregular meiosis in *Lycium halimifolium* MILL. produced by gall mites (*Eriophyes*). Jour. Genet. 21; 113—5, Pl. XI.
- KREUTER, E. 1929. — Chromosomenstudien bei den Galegeen. Ber. Deu. Bot. Ges. 47; 99—101.
- KUHN, E. 1929. — Die Beziehung der Chromocentren zur Chromosomenbildung. Ber. Deu. Bot. Ges. 47; 420—30.
- KULKARNI, C. 1929a. — Meiosis in pollen mother cells of strains of *Oenothera pratincta* BARTLETT. Bot. Gaz. 87; 218—59, Pl. VII—IX.
- KULKARNI, C. G. 1929b. — Meiosis in *Oenothera franciscana*. Mich. Acad. Sci. Arts & Letters 9; 223—6.
- KULKARNI, C. G. 1929c. — Meiosis in the sporocytes of two mutations of *Oenothera pratincta* and their hybrids. Amer. Jour. Bot. 16; 606—20, Pl. LVIII—LXI.
- LAMMERTS, W. 1929. — Interspecific hybridization in *Nicotiana*. IX. Further studies of the cytology of the backcross progenies of the *paniculata-rustica* hybrid. Genetics 14; 286—304.
- LAWRENCE, W. J. C. 1929. — The genetics and cytology of *Dahlia* species. Jour. Genetics 21; 125—59, Pl. XII.

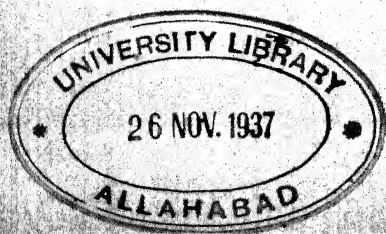
- LESLEY, J. W. & M. M. LESLEY, 1929. — Chromosome fragmentation and mutation in tomato. *Genetics* 14; 321—36.
- LEVAN, A. 1929. — Zahl und Anordnung der Chromosomen in der Meiosis von *Allium*. *Hereditas* 13; 80—7.
- LI, J. 1929. — The formation of four-stranded chromosomes in the amphinucleus of *Funkia Sieboldiana*. *China Journal Shanghai* 10; 142—4.
- LINDENBEIN, W. 1929. — Cytologische Untersuchungen über die Sterilitätsursachen einiger Stein- und Kernobstsorten. *Gartenbau Wissenschaft* 2; 133—57.
- LINDSAY, R. H. 1929. — The chromosomes of some dioecious angiosperms. *Proc. Nat. Acad. Sci.* 15; 611—13.
- LINDSTROM, E. W. 1929. — A haploid mutant in the tomato. *Jour. Hered.* 20; 23—30.
- McCLINTOCK, B. 1929a. — A cytological and genetical study of triploid maize. *Genetics* 14; 180—222, Pl. I—VI.
- McCLINTOCK, B. 1929b. — A $2n - 1$ chromosomal chimaera in maize. *Jour. Hered.* 20; 218.
- MADGE, M. 1929. — Spermatogenesis and fertilization in the cleistogamous flower of *Viola odorata* var. *praecox* GREGORY. *Ann. Bot.* 43; 545—77, Pl. XII.
- MAEDA, T. & K. KATO, 1929. — Chromosome arrangement. VII. The pollen mother cells of *Spinacia oleracea* MILL. and *Vicia faba* L. *Mem. Coll. Sci. Kyoto Imp. Univ. Ser. B.* 4; 327—45, Pl. XXX.
- MATSUDA, H. 1928. — Études sur la formation des grains du pollen anormaux chez la Pétunie (Japanese). *Proc. Crop. Sc. Soc. Japan* 2; 50—1. From summary *Jap. Jour. Bot.* 4; (93).
- MEDWEDEWA, G. B. 1929. — Über die „Trabanten“ bei *Crepis Dioscoridis* L. *Zeitschr. Wiss. Bio. Abt. B. Zeitschr. Zellforsch. Mikros. Anat.* 10; 150—163.
- MELBURN, M. C. 1929. — Heterotypic prophase in the absence of chromosome pairing. *Can. Jour. Research I*; 512—27.
- MEURMAN, O. 1929a. — Association and types of chromosomes in *Aucuba japonica*. *Hereditas* 12; 179—209.
- MEURMAN, O. 1929b. — *Prunus Laurocerasus* L., a species showing high polyploidy. *Jour. Genetics* 21; 85—94, Pl. IX.
- MIYAJI, Y. 1929. — Studien über die Zahlen-verhältnisse der Chromosomen bei der Gattung *Viola*. *Cytologia* 1; 28—58.
- MORINAGA, T. 1929a. — Interspecific hybridization in *Brassica*. I. The cytology of F_1 hybrids of *B. napella* and various other species with 10 chromosomes. *Cytologia* 1; 16—27, Pl. I—IV.
- MORINAGA, T. 1929b. — Interspecific hybridization in *Brassica*. II. The cytology of F_1 hybrids of *B. cernua* and various other species with 10 chromosomes. *Jap. Jour. Bot.* 4; 277—89, Pl. XXVI—XXVIII.
- MORINAGA, T. 1929c. — Interspecific hybridization in *Brassica*. III. The cytology of a F_1 hybrid of *B. cernua* and *B. napella*. *Jour. Dept. Agr. Kyushu Imp. Univ.* 2; 199—206, Pl. VI, VII.

- MORINAGA, T., FUKUSHIMA, E., KANÔ, T., MARUYAMA, Y. and Y. YAMASAKI, 1929. — Chromosome numbers of cultivated plants II. Bot. Mag. Tokyo 43; 589—94.
- MOWERY, M. 1929. — Development of the pollen grain and the embryosac of *Agropyron repens*. Bull. Torr. Bot. Club 56; 319—24, Pl. XIV.
- MÜNTZING, A. 1929. — Cases of partial sterility in crosses within a Linnean species. Hereditas 12; 297—319.
- MUTO, A. 1929. — Chromosome arrangement. II. The meiotic divisions in pollen mother cells of *Phaseolus chrysanthos* SAV. and *Cassia occidentalis* L. Mem. Coll. Sci. Kyoto Imp. Univ. Ser. B. 4; 265—71.
- NAGAO, S. 1929a. — Karyological studies of the *Narcissus* plant. Mem. Coll. Sci. Kyoto Imp. Univ. Ser. B. 4; 175—98.
- NAGAO, S. 1929b. — Chromosome arrangement. VIII. The heterotype division of pollen mother cells in a triploid variety of the *Narcissus* plant. Mem. Coll. Sci. Kyoto Imp. Univ. Ser. B. 4; 347—52.
- NAKAMURA, M. 1929. — Cytological studies in the genus *Citrus*. I. On the *Wase Satsuma* originated through bud variation. Studia Citologica, Tanaka Citrus Expt. Sta. 3; 1—14, Pl. I—III.
- NAWASCHIN, M. 1928. — The morphology of cell nuclei in the species of *Crepis* L. in relation to the question of species formation. NAWASCHIN Jubilee volume, State Timiriazeff Institute Moscow; 171—86, Pl. I.
- NAWASCHIN, M. 1929. — Studies on polyploidy. I. Cytological investigations on triploidy in *Crepis*. Univ. Calif. Pub. Agr. Sci. 2; 14; 377—400, Pl. 56—57.
- NEBEL, B. R. 1929a. — Chromosome counts in *Vitis* and *Pyrus*. Amer. Nat. 63; 188—9.
- NEBEL, B. 1929b. — Zur Cytologie von *Malus* und *Vitis*. Die Gartenbauwissenschaft 1; 549—92.
- NEBEL, B. 1929c. — Über einige Obstkreuzungen aus dem Jahre 1929 und „Zur cytologie von *Malus* II”. Der Züchter 1; 209—17.
- NEGRUL, A. M. 1929. — Chromosomenzahl und der Reduktionsteilung bei Artbastarden der Weinrebe *Vitis*. (Russ. with German summary). Wissenschaftliche Arbeiten (Odessa) 1; 75—99.
- NEWTON, W. C. F. & C. D. DARLINGTON, 1929. — Meiosis in polyploids. Jour. Genetics 21; 1—15.
- NEWTON, W. C. F. & C. PELLEW, 1929. — *Primula Kewensis* and its derivatives. Jour. Genetics 20; 405—67, Pl. XI—XIII.
- OGAWA, K. 1929. — Chromosome arrangement. V. Pollen mother cells in *Torilis anthriscus* BERNH. and *Peucedanum japonicum* THUNB. Mem. Coll. Sci. Kyoto Imp. Univ. Ser. B. IV; 309—22, Pl. XXIX.
- PARÄUSKAJA, I. 1929. — The female flower of grapes. Proc. U.S.S.R. Congress of Genetics, Plant and Animal Breeding (reported by NEGRUL, 1929).
- PETO, F. H. 1929. — Chromosome numbers in the Agropyrons. Nature 124; 181—2.

- PHILIPTSCHENKO, J. 1929. — Ein neuer Fall von Speltoidmutationen beim Weizen. Zeitschr. Indukt. Abst. Vererb.lehre 52; 406—13.
- PLOTNIKOV, T. V. 1928. — Forms with high chromosome numbers in the progeny of the wheat-rye hybrids. Contributions from Sc. Plant. Breed. Inst. 2; 203—8.
- POPOVA, G. M. 1929a. — Species hybrids in the genus *Aegilops* L. Bull. Appl. Bot. Genet. Plant Breed. 22; 329—434.
- POPOVA, G. M. 1929b. — Hybrids of *Aegilops juvenalis* (THELL). EIG. \times *Triticum vulgare* Host. Bull. Appl. Bot. Genet. Plant Breed. 22; 435—54.
- RAU, N. S. 1929a. — On the chromosome numbers of some cultivated plants of South India. Journ. Indian Bot. Soc. (Madras) 8; 126—8.
- RAU, N. S. 1929b. Further contributions to the cytology of some crop plants of South India. Jour. Indian. Bot. Soc. (Madras) 8; 201—6.
- RICHARDSON, E. 1929. — A chromosome ring in *Pisum*. Nature 24; 579.
- ROHWEDER, H. 1929. — Über Kernuntersuchungen an *Dianthus*-Arten. Ber. Deu. Bot. Ges. 47; 81—6.
- RUDLOFF, K. F. 1929a. — Zur Kenntnis der *Oenothera purpurata* KLEHBAHN und *Oenothera rubricaulis* KLEHBAHN. Zeitschr. Indukt. Abst. Vererb.lehre. 52; 191—235.
- RUDLOFF, C. F. 1929b. — *Oenothera*, ein Sonderfall von Faktoren und Chromosomenbindung. Der Züchter 1; 33—40.
- RYBIN, W. 1929. — Über einen allotetraploiden Bastard von *Nicotiana Tabacum* \times *N. sylvestris*. Ber. Deu. Bot. Ges. 47; 385—93, Pl. VI.
- SAPEHIN, L. A. 1929. — Die faktorielle Natur der Unterschiede im Verlaufe der Reduktionsteilung. (Russ. with German summary). Wissenschaftliche Arbeiten (Odessa) 1; 3—16.
- SAX, K. 1929a. — Chromosome behavior in *Sorbopyrus* and *Sorbaronia*. Proc. Nat. Acad. Sci. 15; 844—5.
- SAX, K. 1929b. — Chromosome counts in *Vitis* and related genera. Proc. Amer. Soc. Hort. Sci. 32—33.
- SCHIEHMANN, E. 1929. — Zytologische Beiträge zur Gattung *Aegilops*. Ber. Deu. Bot. Ges. 47; 164—81, Pl. IV.
- SHEFFIELD, F. M. L. 1929. — Chromosome linkage in *Oenothera*, with special reference to some F_1 hybrids. Proc. Roy. Soc. London Ser. B. 105; 207—30, Pl. I, II.
- SHIMAMURA, T. 1929. — Meiosis in *Rumex pulcher* L. Jour. Roy. Micro. Soc. Ser. III 49; 211—6, Pl. I, III.
- SHIMOTOMAI, N. 1929. — Über die Chromosomenzahlen bei einigen Potentillen. Sci. Rep. Tohoku Imp. Univ. 4 Ser. 4; 369—72.
- SHINKE, N. 1929. — Chromosome arrangement. IV. The meiotic divisions in pollen mother cells of *Sagittaria Aginashi* MAKINO and *Lythrum salicaria* L. var. *vulgare* D. C., subvar. *genuina* KOEHNE. Mem. Coll. Sci. Kyoto Imp. Univ. Ser. B. 4; 283—308, Pl. XXVIII.
- SHOJI, T. and T. NAKAMURA, 1928. — On the dioecism of garden asparagus (*Asparagus officinalis* L.) Jap. Jour. Bot. 4; 125—151.

- SIENICKA, A. 1929. — Über den Blütenbau und den Pollenbildungsvorgänge bei *Hemerocallis fulva* fl. pleno. Acta. Soc. Bot. Polon. 6; 296—334, Pl. XVIII—XX.
- SIMONET, M. 1929a. — Nouvelles recherches sur le nombre des chromosomes chez les hybrides des *Iris* des jardins (*Iris germanica* Hort.). C. R. Acad. Sci. Paris 188; 82—4.
- SIMONET, M. 1929b. — Le nombre des chromosomes chez les *Iris*. Jour. Soc. Nat. Hort. France 5, Ser. 2; 88—94.
- SIMONET, M. 1929c. — Sur l'étude cytologique de quelques hybrides d'*Iris* (Groupe *Pogoniris*). Bull. mens. Soc. Nat. Hort. France 2; 455—63.
- SIMONET, M. 1929d. — Nouvelles recherches sur le nombre des chromosomes chez les *Iris* et sur l'existence de mitoses didiploïdes dans ce genre. C. R. Soc. Biol. 103; 1197—1200.
- SIMONET, M. 1929e. — Étude cytologique de *Linum usitatissimum* L. et de *Linum angustifolium* HUDS. Arch. d'Anat. Micros. 25; 372—81, Pl. VIII, IX.
- SINOTO, Y. 1929a. — On the tetrapartite chromosome in *Humulus Lupulus*. Proc. Imp. Acad. Tokyo 5; 46—7.
- SINOTO, Y., 1929b. — Chromosome studies in some dioecious plants with special reference to the allosomes. Cytologia 1; 109—191.
- SKOVSTED, A. 1929. — Cytological investigations of the genus *Aesculus* L. with some observations on *Aesculus carnea* WILLD. a tetraploid species arisen by hybridisation. Hereditas 12; 64—70.
- SOROKIN, H. 1929. — Idiograms, nucleoli and satellites of certain *Ranunculaceae*. Amer. Jour. Bot. 16; 407—20, Pl. XXXVIII.
- SOUZA VIOLANTE, J. R. DE 1929. — La parasyndèse dans *Balsamina hortensis* et *Campanula persicifolia*. La Cellule 39; 233—267, Pl. I—IV.
- SPRUMONT, G. 1928. — Chromosomes et satellites dans quelques espèces d'*Ornithogalum*. La Cellule 38; 269—92.
- STÄHLIN, A. 1929. — Morphologische und zytologische Untersuchungen an Gramineen. Pflanzenbau 1; 330—98, Pl. I—IX.
- STANER, P. 1929. — Préréduction ou postréduction dans *Listera ovata* R. Br. La Cellule 39; 217—231, Pl. I—II.
- STOUT, A. B. & T. SUSA, 1929. — Chromosome irregularities in relation to sterility in *Hemerocallis fulva* clon *Europa*. Ann. N. Y. Acad. Sci. 31; 1—30, Pl. I—III.
- SZTAJGERWALDÓWNA, M. 1929. — Quelques détails de la cinèse de maturation *Mercurialis annua* s. Acta. Soc. Bot. Polon. 6; 335—40, Pl. XXI—XXII.
- TAKENAKA, Y. 1929. — Karyological studies in *Hemerocallis*. Cytologia 1; 76—83, Pl. VIII—IX.
- TISCHLER, G. 1929a. — Revisionen früherer Chromosomen-zahlungen und anschliessende Untersuchungen. Planta: Archiv. Wiss. Bot. Zeitschr. Wiss. Biol. Abt. E. 8; 685—97.
- TISCHLER, G. 1929b. — Verknüpfungsversuche von Zytologie und Systematik bei den Blütenpflanzen. Ber. Deu. Bot. Ges. 47; I. General versammlungsheft 30—49.

- TUSCHNjakova, M. 1929a. — Embryologische und zytologische Beobachtungen über *Listera ovata*. Planta: Archiv. Wiss. Bot. Zeitschr. Wiss. Biol. Abt. E. 7; 29—44.
- TUSCHNjakova, M. 1929b. — Untersuchungen über die Kernbeschaffenheit einiger diözischer Pflanzen. Planta: Archiv. Wiss. Bot. Zeitschr. Wiss. Biol. Abt. E. 7; 427—43.
- UDDLING, A. 1929. — Die Chromosomenzahlen von drei *Circaea*-Arten. Hereditas 12; 294—6.
- UFER, M. 1929. — Die experimentelle Erzeugung polyploider Rassen. Der Züchter 1; 226—30.
- VILMORIN, R. DE, 1929. — Étude cytologique du *Solanum Commersonii*. Arch. d'Anat. Micros. 25; 382—7, Pl. X.
- VRIES, H. DE, 1929. — Über das Auftreten von Mutanten aus *Oenothera Lamarckiana*. Zeitschr. Indukt. Abst. Vererb. lehr. 52; 121—90.
- WEITZEL, G. 1929. — Chromosomenstudien bei den *Fagales*. Bot. Arch. 25; 258—84, Pl. II.
- WHYTE, R. O. 1929a. — Chromosome studies. I. Relationship of the genera *Alstroemeria* and *Bomarea*. II. Interspecific hybrids in the genus *Nolana*. New Phytol. 28; 319—44.
- WHYTE, R. O. 1929b. — Studies in *Ranunculus*. II. The cytological basis of sex in *R. acris* L. Jour. Genet. 21; 183—91.
- WINGE, Ö., 1929. — On the nature of the sex chromosomes in *Humulus*. Hereditas 12; 53—63.
- WINTON, D. DE, 1929. — Inheritance in *Primula sinensis*. Jour. Roy. Hort. Soc. 54; 84—90.
- WOLF, P. 1929. — Zytologische Untersuchungen über verschiedene Formen der *Mentha piperita*. Beitr. Biol. Pflanz. Cohn. 17; 351—92.
- WOODWORTH, R. H. 1929a. — Cytological studies in the *Betulaceae*. I. *Betula*. Bot. Gaz. 87; 331—63, Pl. XI, XII.
- WOODWORTH, R. H. 1929b. — Parthenogenesis and polyembryony in *Alnus rugosa* (DUROI) SPRENG. Science 70; 192—3.
- WOODWORTH, R. H. 1929c. — Cytological studies in the *Betulaceae*. II. *Corylus* and *Alnus*. Bot. Gaz. 88; 383—99.
- WOYCICKI, Z. 1929. — Die Entwicklung des Embryosackes bei *Haemanthus Katharinae*. Acta Soc. Bot. Polon. 6; 193—202, Pl. VI—VIII.
- YARNELL, S. H. 1929a. — Notes on the somatic chromosomes of the seven-chromosome group of *Fragaria*. Genetics 14; 78—84, Pl. I, II.
- YARNELL, S. H. 1929b. — Meiosis in a triploid *Fragaria*. Proc. Nat. Acad. Sci. 15; 843—4.



5813-31
2